

NETWORK WORLD

The Newsweekly of User Networking Strategies

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Novell buys Excelan to extend reach

By Susan Breidenbach
West Coast Bureau Chief

PROVO, Utah — Novell, Inc. last week reached a definitive agreement to acquire network protocol specialist Excelan, Inc., cementing a relationship that has been building between the companies for the past two years.

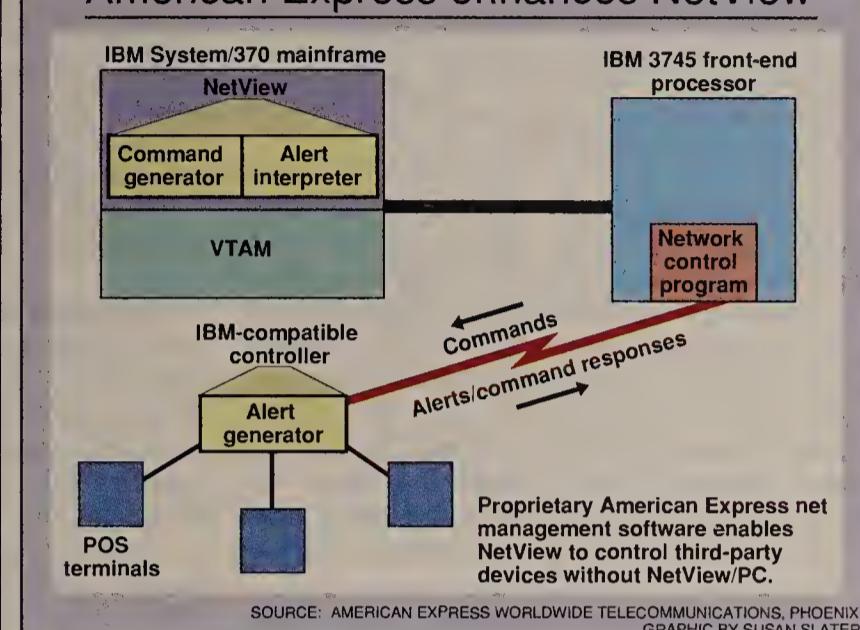
Under the terms of the agreement, Excelan stockholders will receive newly issued Novell stock in exchange for their shares. The deal is valued at as much as \$170 million.

If consummated, the deal would give Novell considerable expertise in network transport protocols and products — including those based on Transmission Control Protocol/Internet Protocol and the Open Systems Interconnection model — which could benefit its open systems strategy.

Excelan will provide Novell with software to link dissimilar systems such as Apple Computer, Inc. Macintoshes, Digital Equipment Corp. VAXes, IBM Personal Computers and Unix-based systems.

Excelan's Kinetics, Inc. division is a Macintosh connectivity pioneer that leads the AppleTalk- (continued on page 43)

American Express enhances NetView



User sidesteps NetView/PC with direct NetView link

American Express unit develops tools to link devices to NetView without PC-based interface.

By Paul Desmond
Staff Writer

PHOENIX — American Express Worldwide Telecommunications last week said it has developed a way to manage third-party terminal controllers directly from IBM's NetView network management system, without using NetView/PC.

The company ultimately hopes to control its worldwide voice/data network with Net- (continued on page 39)

View. But it does not want to use NetView/PC to support non-IBM equipment because of the expense and the number of points of failure that the interface would introduce, according to Brian Brener. He is director of the NetView interface development project at American Express Worldwide Telecommunications, a division of American Express Travel Related Services Co. based (continued on page 39)

AT&T reveals rates for FTS 2000 deal

Carrier to publicize guarded data, says feds will pay significantly less than other users for service.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T last week outlined the prices it will charge the federal government for FTS 2000 services and said it will file a public tariff with the services' rate data by the end of the month.

In January, AT&T asked the Federal Communications Commission not to release the price information in its original Federal Telecommunications System 2000 tariff. That request, which was rejected by the FCC earlier this month, drew a storm of protest from opponents who said that without public inspection, it would be impossible to determine whether FTS 2000 services were priced fairly.

During a meeting last week of Capitol Women and Men in Telecommunications, a group of network professionals based here, a top AT&T official discussed how the carrier will structure its FTS 2000 prices and said rates for switched services could be as low as 13.5 cents per minute — a rate well below that offered to commercial users even under special

tariff arrangements.

In a letter to the FCC last week, AT&T also said it intends to resubmit its tariff for FTS 2000 services (continued on page 39)

INSIDE



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X.500 eases user's E-mail integration

By Jim Brown
New Products Editor

TORONTO — Ontario Hydro has developed a corporatewide electronic mail directory, based in part on the CCITT X.500 standard, that makes it easier for employees using disparate E-mail systems to exchange messages across multiple nets.

The utility giant is one of the first users to experiment with X.500, which defines a method for building a distributed messaging directory.

Ontario Hydro, which supplies electric power to the province of Ontario, used portions of the X.500 directory standard and the Advanced Research Projects Agency Network (ARPANET) internetworking specification to build its directory.

"It's something in between ARPANET and X.500 that we hope we can upgrade to pure X.500," said Peter Carayannakis, the utility's technical specialist (continued on page 39)

NETLINE



supporting wideband packet networks. Page 3.

AMERICAN AIRLINES SIGNS an \$18 million contract for Northern Tel packet net equipment. Page 5.

THE BIG COUNT goes high-tech as the Census Bureau builds a nationwide data network. Page 5.

DEC'S PETER BROWN talks about international networking. Page 29.

AT&T AND USERS will both benefit under newly adopted price cap regulation. Page 2.

A PRICE WAR RAGES as token-ring adapter card makers try to wrest business from IBM. Page 2.

AT&T OFFERS DISCOUNTS for new users of its MegaCom WATS and MegaCom 800 services. Page 3.

USERS SHOULD HEAR from AT&T soon on new products

FEATURE



DEC still tuning up its net management entry

Third-party vendors vie to join DEC's Enterprise Management Architecture effort.

By Bruce Guptill
Features Writer

Vendors' promises of integrated network management sound like beautiful music to user companies. More and more firms are seeking the capability to manage all of their diverse information equipment from a central point.

While users wait impatiently, several vendors are warming up behind the scenes, all hoping users will want to dance to their renditions of the integrated net management tune.

Digital Equipment Corp. is



the latest major vendor with an enterprise-wide network man- (continued on page 27)

AT&T and users to benefit from price cap regulation

Industry analysts see carrier reaping more profits, users garnering net upgrades, improved services.

By Bob Brown
Senior Writer

The FCC's decision to implement controversial price cap regulation for AT&T is good news for the long-distance carrier as well as users, industry watchers said last week.

Analysts said AT&T can dramatically increase its profitability by cutting costs, which they expect it to do. Users will benefit because AT&T is likely to earmark some of its additional profit for network upgrades as well as research and development into new services, they said. That could put pressure on other carriers to improve their services and facilities.

But analysts are divided on how AT&T will use its new pricing flexibility under price caps. Some foresee dramatic changes in pricing, which could spark a price war and problems for rivals US Sprint Communications Co. and MCI Communications Corp. Others said AT&T will be judicious in its pricing moves, thereby posing little threat to the competitive status quo.

Under the price cap plan, which takes effect July 1, AT&T services are grouped into so-called service baskets and a limit,

or cap, is placed on AT&T's revenue from each basket. AT&T can raise or lower prices for individual services within each basket by a maximum of 5% a year.

Under current rate-of-return regulation, AT&T can recoup its operating costs plus an additional 12.75% on its investment.

The plan is a "form of regulation more consistent with the competition in the marketplace," said Joel Lubin, director of marketing services for AT&T's Marketing Services Group in Basking Ridge, N.J. The regulatory scheme will reward AT&T with higher profits for innovation and attention to efficiency, he said.

"The price cap plan is positive for AT&T," agreed David Boczar, assistant vice-president and telecommunications analyst at New Japan Securities International, Inc. in New York. "The plan gives AT&T the incentive to become more efficient, to lower its costs and have the gains work their way down to net income increases," he said.

There are a number of areas where AT&T will try to pare costs, including through additional job cuts, analysts said. Advertising, entertainment and travel are other

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Token-ring adapter card suppliers wage price war

Board prices drop as firms brawl for market share.

By Susan Breidenbach
and Laura DiDio
Network World Staff

Vendors of 4M bit/sec token-ring network adapter cards are waging a price war aimed at grabbing market share from IBM and converting users from other local networks such as Ethernet.

Last week, Western Digital Corp. entered the token-ring adapter market with two 4M bit/sec cards priced at \$499 and \$599. Earlier this month, Racore Computer Products, Inc. introduced an eight-bit, 4M bit/sec token-ring adapter that costs \$399, and 16-bit and Micro Channel versions that sell for \$499 each. Those introductions come on the heels of NCR Corp.'s announcement last November that it had lowered the price of its 4M bit/sec, eight-bit token-ring board to \$395.

Just a year ago, token-ring adapters sold at an average price of \$695 to \$895, depending on memory and configuration. Users said the more attractive pricing, combined with value-added features, make them will-

ing to sample third-party 4M bit/sec token-ring adapter cards. The caveat is that vendors must ensure prospective users that their token-ring boards will interoperate with IBM's network adapters and systems.

"We're mainly an IBM shop, but if third-party vendors can save us money and ensure compatibility [with IBM equipment], then we're certainly amenable to buying the less expensive token-ring boards," said John Jones, senior supervisor of network projects at Chevron Corp. in Houston.

Suzanne James, communications manager at PepsiCo, Inc. in Peekskill, N.Y., agreed with Jones. "We're well aware of the price war," she said. "Even though our headquarters office is all IBM, there's a distinct possibility that we'll buy cheaper token-ring cards from third-party vendors so long as they interoperate with our IBM equipment."

IBM has quietly cut prices on its Token-Ring adapters. An IBM spokeswoman confirmed that the company lowered the price of its

(continued on page 42)

Briefs

FCC to local carriers: Cut rates. The Federal Communications Commission last week ordered local exchange carriers to reduce their interstate access rates by a total of \$705 million.

The reductions, which take effect Saturday, were ordered because the FCC found errors in the calculations used by local carriers to set rates for 1989. The local carriers had overestimated some costs and underestimated traffic volume by 2.5 billion minutes. The mandated reductions in access charges, which will decrease interexchange carriers' costs, are expected to be passed along to customers in the form of reduced long-distance rates.

Twist of fate for standard. An IEEE 802.3 Ethernet standards subcommittee last week finalized a proposed standard for 10M bit/sec Ethernet that use unshielded twisted-pair telephone wire. The proposal is now slated to go before both the full IEEE 802.3 voting body and the International Standards Organization for approval, said Pat Thaler, principal engineer at Hewlett-Packard Co. and chairwoman of the 10BaseT committee. The standard could be approved by next January, after which products based on it would become available.

LTV taps Racal's modem, mux lines. LTV Steel Co., Inc. has selected Racal-Milgo, a division of Racal Data Communications, Inc., to supply more than 200 diagnostic modems as well as multiplexers, software and a network management system for the steel maker's 42-site data network across 14 states. The contract, announced last

week, covers Racal-Milgo's 9.6K bit/sec Omnimode 96 diagnostic modems, Omnimux statistical multiplexers and Racal's Communications Management Series network management system.

Bush nominates networking aide. President George Bush last week nominated Janice Obuchowski as assistant secretary of commerce for communications and information. She will also head the National Telecommunications and Information Administration, an agency responsible for advising the president on technology issues. Obuchowski is currently the executive director of international affairs for Nynex Corp.

Obuchowski will replace Alfred Sikes, who has not announced his future plans.

Certified for ISDN. Northern Telecom, Inc. last week acknowledged that Network Equipment Technologies, Inc.'s (NET) intelligent T-1 multiplexers can support an Integrated Services Digital Network Primary Rate Interface circuit between Northern Telecom's Meridian SL-1 private branch exchanges.

The announcement does not add new capability to NET's Integrated Digital Network Exchange (IDNX) since NET made no changes to the multiplexer's hardware or software. Tim Shafer, NET's ISDN product manager, said the certification means users can be assured that an IDNX T-1 network is physically compatible with the Primary Rate Interface specification and that SL-1s with that capability can pass bits over the T-1 network.

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Telecommunications

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Data Communications

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Local Networking

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Management Strategies

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AT&T discounts MegaCom WATS, MegaCom 800 long-distance rates

By Gail Runnoe
Washington Correspondent

BASKING RIDGE, N.J. — AT&T last week announced promotional discounts for customers that place new orders for MegaCom WATS or MegaCom 800 and use Accunet T1.5 service to access an AT&T switching center.

AT&T will waive T-1 line installation charges and one month's T-1 service charges for users that order MegaCom WATS or MegaCom 800 service before May 5. Installation must be completed by June 21.

T-1 installation charges average about \$2,000, AT&T said, and monthly charges average about \$1,000. Both charges vary according to the customer's distance from the nearest AT&T serving center.

The MegaCom promotion is the fourth limited-time new-customer incentive program AT&T has announced since the beginning of the year. The carrier recently extended its Pro WATS promotion, which

began in January, and last month offered to waive certain fees for its Software-Defined Network (SDN) service ("AT&T seeks to waive SDN fees as part of promotion," *NW*, Feb. 6). The company has also asked the Federal Communications Commission for permission to discount initial charges for its Reach Out America program during May and June.

AT&T said it is offering the latest promotion to draw attention to lower MegaCom WATS and MegaCom 800 rates that become effective April 1.

As of next month, fixed monthly

charges for both MegaCom services will be slashed from \$870 to \$50. In addition, MegaCom WATS monthly usage charges will be discounted by 5% for usage volumes between \$10,000 and \$30,000, and by 10% for usage volumes higher than \$30,000. MegaCom 800 usage charges will be discounted by 10% for usage volumes between \$10,000 and \$30,000, and by 15% for volumes higher than \$30,000.

Under both MegaCom programs, volume discounts will apply to both interstate and intrastate long-distance calls.

In its tariff revision filing, AT&T told the FCC that the T-1 discounts were necessary to make its MegaCom services more competitive with similar offerings from rivals MCI Communications Corp. and US Sprint Communications Co. AT&T cited a current MCI promotion that offers new

customers free T-1 installation and one month of free T-1 access for using T-1 service in conjunction with MCI Prism or MCI 800 Service. US Sprint, AT&T said, offers similar incentives for customers that order T-1 access for Ultra WATS and Ultra 800.

Robert Self, founder of Market Dynamics, a New York consulting firm, and author of *Long Distance for Less*, sees the MegaCom promotion as "a strong competitive move" for AT&T. "AT&T has not been winning the business race," he said, because of its failure to "convince the public they're willing to go the extra mile on price."

MegaCom WATS service is targeted at business users with monthly long-distance call volumes of at least 600 hours of voice and data. MegaCom 800 service is targeted at customers that receive at least 850 hours of long-distance calls per month. \square

AT&T to unveil details of new wideband nets

By Bob Wallace
Senior Editor

NEW ORLEANS — AT&T Network Systems Group will reveal details next month about wideband packet network products that enable users and telephone companies to build packet networks supporting voice and data.

Developers at AT&T Bell Laboratories detailed AT&T's wideband packet plans in a presentation at the recent ENTELEC 89 Conference here. In a letter distributed to session attendees, AT&T Network Systems promised to provide product-specific information by the end of April.

The Integrated Access and Cross-Connect System (IACS) is the company's first planned wideband packet offering. It consists of Integrated Access Terminals (IAT), which will packetize voice and data traffic for transmission across T-1 capacity pipes, and a centralized network management system known as an Integrated Access Controller (IAC).

IATs can be located at the customer's premises in private wideband packet networks or at central office switch sites to provide wideband packet services.

The IAT encodes and decodes speech and acts as a packetizer and statistical multiplexer. The device compresses and integrates voice, analog data, digital data, signaling, image and network control into packets of common format.

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Clarification: The story "DCA plots future as single-source vendor" (*NW*, March 13) reported that Digital Communications Associates, Inc. sells its 10NET Communications local network products through its wide-area network unit. The company also sells local net products through distributors.

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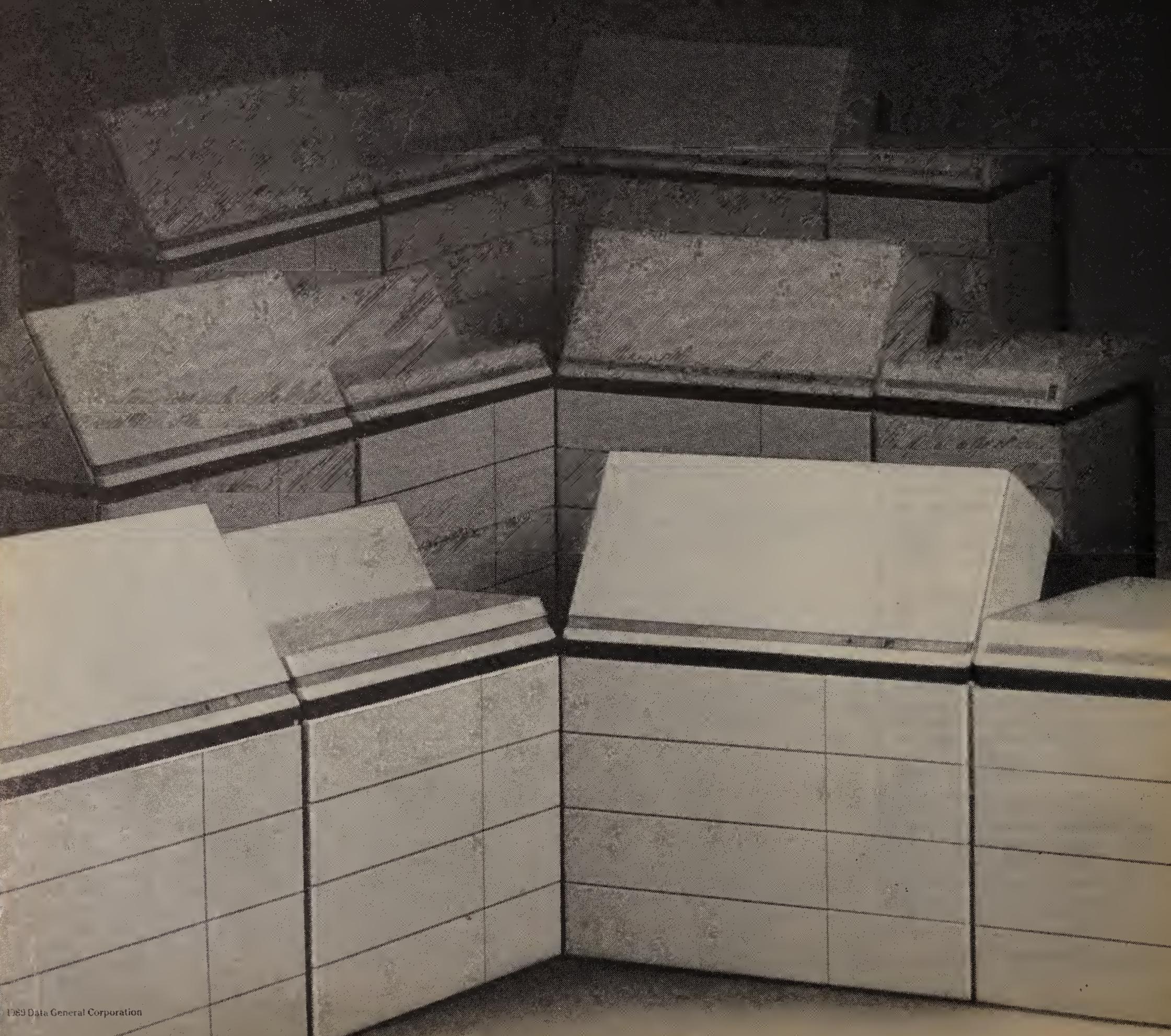
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Fire convinces Census Bureau to turn to nationwide computer net

VAX net will speed processing of questionnaires, cut costs.

By Bob Brown
Senior Writer

SUITLAND, Md. — In 1980, a fire gutted a U.S. Bureau of the Census office in Brooklyn, N.Y., destroying thousands of completed census forms and forcing the agency to resurvey that area.

The blaze also forced officials from the Census Bureau, which is part of the U.S. Department of Commerce, to rethink the way they conduct "The Big Count" and influenced their decision to install a nation-

wide computer network to support the upcoming 1990 decennial census.

The network, which was pilot-tested during a census dress rehearsal last year, will help Census Bureau officials process millions of questionnaires faster and at lower cost.

"The whole idea is to get computer power distributed as far out as possible to the people actually taking the census," said Ken Riccini, the Census Bureau's assistant chief for processing offices.

Gerald Cranford, the bureau's assistant director for automated data processing, said the network will allow census questionnaires to be accounted for and processed as they are received. In the past, census workers held off on processing until a large number of forms were collected. The forms destroyed in the Brooklyn bureau office fire were awaiting processing when the fire broke out, he said.

"There will be a lot fewer manual steps," Cranford said. "That automatically means more efficiency."

A picture of the country

The census is an important snapshot of America. The information collected from approximately 250 million people is used for such purposes as determining the amount of federal funds allocated to states

and the apportionment of seats in the House of Representatives.

Until now, there has been plenty of room for error in the census. Accounting for forms and amalgamating data was done almost entirely by hand. The only computers used in the 1980 census were the mainframes at the central processing site, Cranford said.

The mainframes tabulate data from the questionnaires so they can be presented in publications that provide statistical information at the national, state, county, city and tract levels.

In 1987, the Census Bureau took a giant step forward when it awarded Digital Equipment Corp. a six-year, \$80 million contract to supply it with VAX computers. The contract also called for DEC to provide

(continued on page 6)

NTI to supply part of Am. Air. global net

By John Cox
Senior Editor

DALLAS — American Airlines, Inc. last week announced a contract with Northern Telecom, Inc. for more than 50 DPN-100 packet switches to be used in the backbone of a global network now under construction.

The network, dubbed InterAACT, will link American Airlines offices worldwide and let 14,000 employees share network resources on a global basis, according to William Jewell, American Airlines' managing director for communications engineering.

The backbone of the global network will support local-area networks being installed in offices as part of a contract awarded to Hewlett-Packard Co. last January.

That contract, valued at an estimated \$18 million, called for the installation of 135 HP 3000 minicomputers configured as servers on local networks supporting microcomputers. The first of those local nets will become operational later this year.

Backbone supports X.25

The HP 3000 minicomputers will be linked to the X.25 backbone. Transmission bandwidth for the X.25 backbone will be taken from available capacity within American Airlines' T-1-based SABRE reservation network, Jewell said.

Using microcomputers supported by local networks, American Airlines employees will communicate with remote offices through the HP minicomputers, which support X.25 transmission of data to the DPN-100 switches. The packet traffic is routed onto the company's T-1 backbone through Network Equipment Technologies, Inc. T-1 multiplexers.

"The reason we consider [X.25] a strategic direction is it's the standard protocol that's accepted internationally and it can carry [IBM] SNA traffic," Jewell said. "We're covering the best of both worlds."

American Airlines will begin bringing up InterAACT this June, when parts of the network will go on-line at the airline's headquarters here.

In subsequent months, similar nets will be brought up in Chicago, Raleigh, N.C., and other cities. □

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Fire convinces Census Bureau to turn to net

continued from page 5

an array of systems integration services (see "Boeing taps DEC for big systems integration job," page 7).

Working with DEC, the Census Bureau has installed MicroVAX 3500s in about 500 temporary district bureau offices. About 80% of all census forms are mailed to these offices or delivered by the 480,000 temporary census employees. The rest of the forms are mailed directly to processing offices.

Forms collected at the district office are logged using bar-coding equipment, and information from completed surveys is entered into the MicroVAXes.

The data collected by the MicroVAXes is

sent via dial-up lines to 13 regional centers, which assist the district offices in following up on unreturned questionnaires and handle administrative tasks such as payroll. The regional offices are each equipped with a VAX 8530 and a VAX 8250 computer, which are clustered.

These regional offices are tied to the mainframe center by 19.2K bit/sec private lines, said Lynn Hollabaugh, chief of the special systems coordination staff at the bureau's beta-test center in Baltimore.

Meanwhile, completed census forms are shipped from the district offices to the nearest of seven regional processing offices. Once the forms arrive at these offices, they are sorted and put onto microfilm. The data from the microfilm forms is transferred into the DEC minicomputers using a process called Film Optical Sensing

Device for Input into Computers. This automated scanning process is expected to save about \$25 million in labor costs.

Each processing office is equipped with a trio of clustered DEC computers, consisting of two VAX 8530s and a VAX 8810, Hollabaugh said. Written responses to the questionnaires are keyed into terminals on DECnet networks and sent to the DEC processors. From the processing offices, data is sent to the central site via 19.2K bit/sec or faster dedicated lines, Hollabaugh said.

Because census forms are highly confidential, the Census Bureau is mainly using dedicated lines to transfer its data, Hollabaugh said.

"We couldn't do our jobs without the network," he said. "Being so decentralized, it would be an impossible task." □

AT&T postpones volume discount on int'l services

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — AT&T last week agreed to postpone until at least April 8 the implementation of a new volume discount plan for users of its dedicated international services.

Earlier this month, AT&T asked the Federal Communications Commission for permission to offer the International Volume Pricing Program (IVPP). Under that plan, customers spending from \$5,000 to more than \$40,000 a month on certain international services would be eligible for either cash rebates or billing credits ranging from 5% to more than 25% of their monthly bills.

The IVPP discounts would apply to AT&T's International Accunet Digital Service, International Dataphone Digital Service, Skynet International Shared Earth Station Service and Private Line Voice Grade Foreign Overseas Half Channel Service.

The discounts were slated to take effect last Friday, but the FCC said it needed more time to review the legality of the offer after TRT Telecommunications Corp., a voice and data services provider based in Wash-

TRT told the FCC that the discount plan would exacerbate discrimination against low-volume users.

▲▲▲

ington, D.C., filed a petition protesting the proposed discounts. TRT told the FCC that the proposed AT&T discount plan would exacerbate discrimination against low-volume users.

If the FCC has no objections to the AT&T plan, the IVPP discounts will take effect April 8. AT&T last week also announced promotional discounts on MegaCom services (see "AT&T discounts MegaCom WATS, MegaCom 800 long-distance rates," page 3).

The proposed IVPP discounts vary according to usage and the length of time the customer commits to the AT&T service. The minimum commitment is one year.

Customers that contract for one year of a covered calling service will receive approximately 5% off monthly billings exceeding \$5,000, 7% off billings between \$25,000 and \$40,000, and 10% off billings exceeding \$40,000. Also, customers that commit to three years of service will receive an additional 10% discount on each volume level, while customers that commit to five years of service will receive an additional 15% discount for each volume level.

Discounts are payable either in cash at the end of the year or as a credit to future international long-haul bills. Penalties would apply to users that drop the service before the term of their contract expires, unless they are upgrading to a higher speed international service. □

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Minnesota lays groundwork for new statewide integrated network

By Paul Desmond
Staff Writer

ST. PAUL, Minn. — Later this spring, the state of Minnesota will begin securing a new statewide data, voice and video backbone network using equipment that will likely comply with the Government Open Systems Interconnection Profile (GOSIP).

The goal of the Statewide Telecommunications and Routing System (STARS) network project is to ensure coordinated planning and procurement of network equipment and transmission facilities. Users of the STARS backbone network will in-

clude state agencies, schools, courts, the legislature and participating city and county governments, said Bob Fischer, director of the STARS project.

Last fall, the state adopted a regulation that requires agencies to conform to GOSIP as of July 1, 1990 ("States jump on the GOSIP bandwagon," *NW*, March 6). "We anticipate that [GOSIP] will be included in the RFP, which isn't scheduled until next fall," Fischer said.

After spending about two months working on an array of architectural designs for the network, the state plans to publish a re-

quest for information in the state register, he said.

Three goals

Although details of the network have not yet been defined, Fischer said the STARS project is driven by three main goals. The first is to cut costs for leased network services by creating a more efficient net and by buying in bulk. All communications lines will be leased, he said, since the state does not want to "become a phone company."

The second goal is to expand the use of two-way interactive video in Minnesota's educational system to include its four institutions of higher education, Fischer said. The state already uses two-way video in grades kindergarten through 12, he said.

A third "implicit" objective is to im-

prove the quality of telecommunications service provided by the carrier that secures the contract. "We hope to encourage whatever carriers get the bid to improve their network infrastructure throughout the state," Fischer said.

State agencies will not be required to route communications traffic over the new backbone. "Our intent isn't to force anybody into it," he said. "It's got to add value; that is an overriding theme."

That added value will come in the form of reduced prices for leased services, improved network management — which will be handled jointly by the state and the carrier — as well as links among once-separate networks, Fischer said.

Currently, an array of logical and physical data, voice and video networks exist in the state. □

Boeing taps DEC for big systems integration job

By Bob Brown
Senior Writer

AUBURN, Wash. — Two divisions of The Boeing Co. last week jointly announced the awarding of a multimillion-dollar systems integration contract to Digital Equipment Corp. to support a new \$235 million Boeing sheet metal facility.

The contract, the value of which was not disclosed, is one of the first major systems integration agreements DEC has signed since outlining its Enterprise Services program at DECWorld '88 last September in Cannes, France.

For Boeing, the contract represents the largest computer-integrated manufacturing (CIM) undertaking in its history. The CIM system will enable the firm's Boeing Commercial Airplanes division's new sheet metal manufacturing plant under construction here to produce in four days parts that once took 40 days to build, said Dee Wolsey, director of sheet metal operations at Boeing Commercial Airplanes.

Terms of the agreement

Under the terms of the contract, which was awarded by Boeing Commercial Airplanes and Boeing Computer Services Co., DEC will provide a data management and control system, as well as a variety of processors ranging from VAXstation 3200 workstations to large VAXclusters. The systems will be networked via DECnet and linked to corporate systems at other Boeing facilities.

As prime contractor, DEC will provide program management, network systems, integration management and ongoing service and support, said Tom Beckwith, DEC's CIM strategic account manager for Boeing-related projects. Several CIM vendors, including ITP Boston, Inc. of Cambridge, Mass., and Consilium, Inc. of Mountain View, Calif., will work on the project under DEC's guidance, he said.

In addition to speeding up the flow time of sheet metal through the factory, the project is designed to improve use of materials by 20%, to reduce inventory and to improve production cost accountability by automating data collection and information handling, Wolsey said.

Boeing will use a factory control system called the Sheet Metal Analysis, Retrieval (continued on page 8)

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AT&T to unveil details of nets

continued from page 3

"Traffic is broken into a sequence of packets that contain built-in intelligence with all the information necessary to get them from one end of the network to the other," said Andy Daecher, a wideband packet technology system engineer with AT&T Bell Labs.

"This [information] includes flags that delimit successive packets, header information identifying the packet as a voice or data packet and the address of that packet," Daecher said.

The information field contains the transmitted bit streams, and the trailer contains checks that maintain the accuracy of the packet, he added.

The IAT uses low bit rate voice-encoding techniques and digital speech interpolation

tions on a T-1 line, Daecher said. The second IACS component, the IAC, manages wideband packet networks composed of multiple IATs. The IAC is software that runs on an AT&T 3B2-600 mini-computer under the Unix System V operating system.

An IAC communicates with IATs using Link Access Procedure

D (LAPD), a protocol used to format packets for transmission over the D channel of an Integrated Services Digital Network link. Each IAC supports eight synchronous LAP D interface ports for wideband packet network access and control. Up to 16 IATs can be supported through a single interface port.

Three asynchronous interface ports are available: one for local access, one for remote access via

an external modem or a local network and one as an interface to an external maintenance system. In addition, an asynchronous console terminal is recommended for 3B2 and Unix maintenance and administration.

The IAC also has a backup data base for each IAT it controls. Each data base contains a mirror image of all provisioning and network routing parameters specific to each IAT.

The backup data bases are automatically updated when provisioning parameters are changed.

Five-minute and hourly polls collect network management data from the IATs. In addition, usage-sensitive billing records are collected. Traffic, network management, engineering and billing data is kept on the IAC for 72 hours and is available on demand. □

Wideband packets and voice-encoding allow 120 conversations on a T-1 line, Daecher said.

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(DSI) to increase voice carrying capacity. The adaptive differential pulse code modulation used provides 48 32K bit/sec voice conversations over a T-1 line, compared with the 24 64K bit/sec conversations provided with traditional pulse code modulation.

Use of DSI makes it possible to insert speech packets in gaps in other conversations. "Because speech activity occupies, on the average, about 40% of the total time in a conversation, DSI raises the capacity by a factor of 2.5," said Mark Gruensfelder, a supervisor at AT&T Bell Labs' advanced digital signal processing department.

Used together, the wideband packet and voice-encoding technologies make it possible to support more than 120 conversa-

Boeing taps DEC for integration

continued from page 7

and Tracking System to support the management, administrative and control requirements of the new plant.

The sheet metal facility is expected to be in operation by mid-1990, and additional computer system functions will be phased in after that, according to Beckwith. DEC will leave the management of the network to Boeing once these additional upgrades are completed.

DEC will support the project from its Seattle location, drawing resources from other offices across the country as needed. □

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ENTELEC show-goers plot SCADA network strategies

By Bob Wallace
Senior Editor

NEW ORLEANS — Despite plummeting oil prices, pipeline companies are bankrolling construction of vast supervisory control and data acquisition

(SCADA) networks to monitor, manage and control their pipeline operations.

Automating these functions enables companies to eliminate costly transmission links such as leased lines and to reduce the

number of workers needed to run an expansive pipeline system.

Pacific Gas and Electric Co. (PG&E) and Williams Pipeline Co. (WPL) discussed their SCADA networks at the ENTELEC 89 Conference here last week. About 3,000 telecommunications managers from petroleum and utility companies across the country attended the annual meeting.

In SCADA networks, centrally located computers poll geo-

graphically dispersed remote terminal units (RTU), which are used to control valves, monitor pressure gauges and operate other pipeline devices. RTU telemetry data can be transmitted back to a central site using leased lines, microwave facilities, fiber-optic cable or satellites.

PG&E recently cut over a distributed SCADA network that enables operators at numerous sites in California to monitor alarms

and control its 36,000-mile gas pipeline.

Eleven PG&E control centers, each equipped with redundant Digital Equipment Corp. Micro-VAX minicomputers, exchange data across a private X.25 network built by Telenet Communications Corp.

The control centers communicate with 210 RTUs along the pipeline via analog microwave facilities. The company bought 14 new microwave radio links to replace the roughly 100 leased lines that made up most of the firm's old SCADA network.

"Rome wasn't built in a day and neither was our gas SCADA system," said John Stuart, project manager for PG&E's new SCADA system. "There were numerous challenging and interesting technical problems to solve during this project."

PG&E anticipated a high failure rate and the associated troubleshooting and labor costs for the 210 new RTUs. To address this problem, PG&E stress-tested each unit in a special chamber, repeatedly raising and lowering

"Rome wasn't built in a day and neither was our gas SCADA system," Stuart said.

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temperatures from minus 5 F to 155 F over three days while monitoring the health of the devices.

Numerous RTUs failed the test and were returned to the manufacturer for replacement under warranty, according to Stuart.

One unforeseen problem was interference with the microwave network installed to support the RTUs. A high-power 929-MHz transmitter used for a paging service was interfering with transmissions to RTUs at 928 MHz. The PG&E radios had to be equipped with special filters to block the interference, Stuart said.

The company did, however, anticipate that the microwave system would create a bottleneck for RTUs. PG&E prepared for this potential problem by creating a report-by-exception scheme, under which each RTU only reports data that had changed markedly since the previous report.

"Using this system, each of the eight ports on a SCADA minicomputer can poll three RTUs per second to see if they have any new data," Stuart said. Thirty RTUs on a single microwave radio system can be scanned every 10 seconds.

Unlike PG&E, WPL, a Tulsa, Okla.-based oil company, chose a centralized system. The company replaced its leased-line SCADA network with a 110-site Ku-band VSAT network spanning 10 states.

(continued on page 43)



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*Datapro, *User Ratings of Network Management Systems*, September, 1988.

**International Data Corporation (IDC), *Quantitative Analysis of the Network Management Market*, October, 1988.

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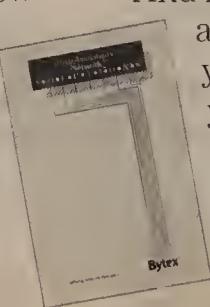
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

The Congressional Institute for the Future, a nonprofit educational institution, has announced a two-year project called "Challenging the Information Age" that is designed to focus congressional attention on an array of issues and technologies related to information services and telecommunications. For more information, call (202) 544-7994.

People & Positions

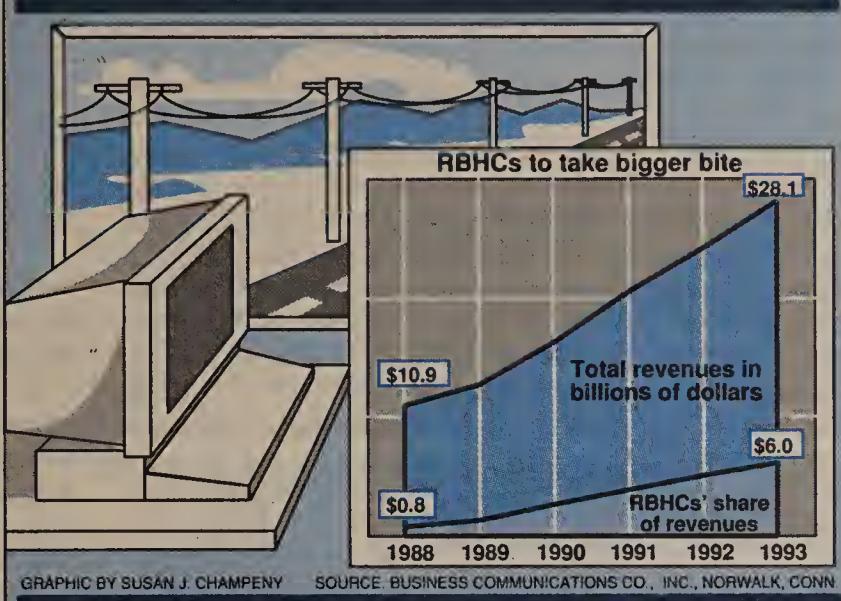
Richard Miller, president and chief executive officer of Rapport Communication, Inc. of Palo Alto, Calif., was recently elected this year's chairman of the **Electronic Mail Association's (EMA)** board of directors. Miller replaces Joseph Norton, assistant vice-president at Western Union Corp., whose one-year term expired.

Other newly elected officers of the EMA board include **Douglas Brackbill**, director of marketing at MCI International, Inc., vice-chairman; **George Cunningham**, division manager, messaging at AT&T, secretary; and **E. Brian Cary**, director of technical support for the American Bar Association, treasurer. The EMA is composed of E-mail users, vendors and consultants.

Bytex Corp. has appointed **Jerome Miller** as marketing senior product manager. In his new position, Miller will be involved in the development and expansion of Bytex's AutoSwitch 240 and Unity 50 electronic matrix switches.

Prior to joining Bytex, Miller served as senior product manager at Avanti Communications Corp. in Newport, R.I. □

Changing information services market



IBM implements 5% price hike on products, services

By Gail Runnoe
Washington Correspondent

PURCHASE, N.Y. — IBM said recently it will raise prices by 5% on nearly all its products and services, including communications products.

The company said some newer products will be exempt from the general price increase, including the Personal System/2 line and related systems software, the Enterprise/3090 Model 100S, and new models of the Application System/400 and 16M bit/sec Token-Ring Network software. Rates and terms of maintenance contracts were also not affected.

The price hikes are effective immediately on onetime charges for hardware, software, systems engineering services and educational programs. Price hikes on

competing vendors followed suit, seeking increased profits under the higher price umbrella set by IBM. This year, however, analysts do not expect to see the same result.

"Sharper competition for market share could be more compelling to competitors this year than the incentive to increase profits," said William Gould, vice-president and analyst at New Japan Securities International, Inc. in New York. "It's a tougher market this year."

Martin Ressinger, IBM analyst with the Chicago-based research firm Duff & Phelps, Inc., said rising prices for dynamic random-access memory (DRAM) chips added to the pressure on competitors to increase prices last year. Now, with DRAM chips available for almost half of what they cost last year, Ressinger said, companies may be less likely to boost computer product prices.

At the same time IBM announced price hikes, it told analysts to lower their predictions for the company's first-quarter earnings. IBM said problems with a chip used in the 3090S mainframe caused delivery delays. IBM refused to give any details on the chip problem, saying only that it had been resolved. The company said the price hikes were unrelated to the financial news.

Analysts had forecast IBM's 1989 first-quarter earnings to be between \$1.65 and \$1.85 per share. IBM said \$1.55 per share is a more accurate estimate. Last year's first-quarter earnings were \$2.10 per share, but that figure reflected a 53-cent increase due to an accounting change.

Prior to IBM's calls to lower earnings predictions, analysts had projected full-year 1989 earnings to be between \$10.50

(continued on page 12)

US Sprint's Esrey on long-haul challenges

Top exec discusses competition with AT&T, MCI, company's strategic plans to boost market share.

AT&T and MCI?
When United Telecommunications, Inc. agreed in July to acquire partner GTE Corp.'s 50% stake in US Sprint Communications Co., United Telecom President and Chief Executive Officer William Esrey took over the helm of US Sprint.

Esrey, 49, joined United Telecom in 1980 and played a leading role in making US Sprint a more important part of the parent company. Esrey, who worked for AT&T in the mid-1960s, is an enthusiastic competitor, eager to prove US Sprint's advantages over his former employer and other long-distance rivals such as MCI Communications Corp.

Network World Senior Writer Bob Brown recently interviewed Esrey on a variety of topics, including the state of the long-distance market, regulatory affairs and the pros and cons of running both local and long-haul operations.

How do you position US Sprint in selling against

AT&T and MCI?

I'd rather talk about what we do and let them speak for themselves on what they do. We clearly have the aim — and we're certainly not there yet — of being the best telecommunications company in the world.

We obviously have had a lead in that 100% of our calls are handled over a fiber-optic network. But our competitors are moving in that direction. That differentiation becomes less and less, although I think it will be there for a long period of time.

How are the carriers trying to differentiate themselves?

Different people buy for different reasons. I believe that roughly a third of the market buys on price. A third of the market probably buys on quality, and a third of the market buys on tradition and safety, which you can translate into AT&T.

I think there will continue to be price competition; in fact, in (continued on page 12)

INDUSTRY BRIEFS

The disaster recovery services market will grow at a 20% annual rate from 1990 to 1995, according to a new study from **The Ledgeway Group, Inc.**, a Lexington, Mass.-based market research and consulting firm.

The market, which was valued at \$425 million in 1988, is expected to increase from \$510 million a year in 1990 to more than \$1 billion by 1995, said Richard Vancil, The Ledgeway Group's ServiceTrends program director.

The disaster recovery services market includes traditional recovery services such as provision of hot-site facilities, contingency planning and consultancy services, as well as packaged offerings such as personal computer-based software planning systems.

Vancil said the driving force behind market growth is users' increasing concern about the vulnerability of vital information-processing and transport systems. The study was based on interviews with vendors and additional research conducted by The Ledgeway Group. For more information about the study, call Vancil at (617) 862-8500.

The North American Telecommunications Association (NATA) has joined forces with **Wye Technologies, Inc.** of Annapolis, Md., to help NATA members position themselves as systems integration companies.

Wye Technologies will work with members of NATA, a trade group of more than 750 manufacturers, suppliers and users of voice and data communications equipment, to identify systems integration opportunities. Wye Technologies' consulting services will be provided as a regular NATA member benefit. Edwin Spievack, NATA's president, said the arrangement "will help [members] package their offerings with other products and services for a real competitive edge." □

US Sprint's Esrey on long-haul challenges

continued from page 11

some respects, it's more intense now than it has been.

Quality is also terribly important. If you go back a few years, that third of the market was owned by AT&T. We would argue that it is no longer owned by AT&T. In fact, they are not the dominant force in that third of the market anymore, although they are taking some rapid steps to modernize their network.

The third part of the market was confusing. It wasn't certain who was doing what and who was going to survive. Maybe it wasn't such a bad idea to stay with the traditional vendor. You couldn't be wrong.

Now you have a situation where management in many companies is coming to

the communications manager and saying, 'I keep hearing good things about this company and that company' and 'Are we trying them, and if not, why not?' It's not that there aren't good reasons to stay with AT&T. But the reasons have to prevail, not the attitude.

Do you think US Sprint will pull ahead of MCI, and if so, when?

We have very, very ambitious plans on how well we are going to do and what we are going to do. I will be very disappointed if we don't succeed to a much greater extent than anybody on the outside expects us to. But I am not going to get into predicting if we are going to pass this [company]

or that [company] and when. I think if you look at some of our recent accomplishments, that is an indicator of the future.

What steps have you taken to rectify US Sprint's billing problems, and how have you tried to overcome the stigma associated with them?

First of all, our billing problems were our own. But I think it has to be put in perspective when you have a company that has grown incredibly after [being formed] from two companies. We not only had the problem of merging two billing systems, but accounts receivable systems, sales systems and commission systems. The company, on balance, performed extremely well in many of these challenges.

What did we do about billing? The first thing we did was change the management

and the leadership in that area. We put a real emphasis on quality control and testing before we put in changes.

We have modified or changed almost every aspect of our billing system. We feel our billing system is on par with industry performance. We are not satisfied with that, and we intend to go beyond that and make billing a competitive advantage. We feel it is a way to differentiate ourselves.

Is there still some stigma left over? There sure is. I wish there wasn't, but that will probably just take time no matter how good we are. It's definitely wearing off.

Have AT&T's single-customer tariffs, such as Tariff 12, affected your efforts to attract business users?

Sure. You have to realize that we spend a lot of time working with large corporate accounts convincing them that we can give the quality of service they demand. Many times that means proving yourself over a long period of time.

We, or anybody else, can't go out and do that with everybody at once. You pick and choose those customers whose needs meet

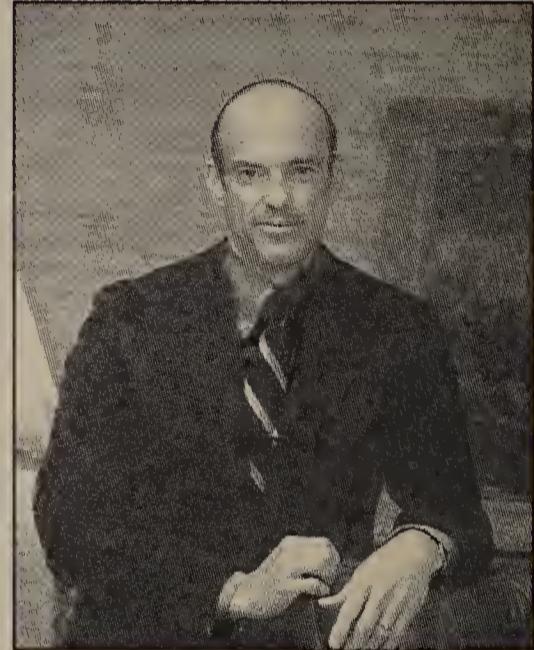


PHOTO COURTESY OF UNITED TELECOMMUNICATIONS, INC.

US Sprint's William Esrey

your ability to serve them and seem to be most receptive to your arguments.

But when you get to the end of the line and suddenly AT&T says we may lose that customer to MCI or Sprint or whoever is making inroads, and they go swooping in and offer that customer a price different than they charge all other customers, that may cost us business. I personally wouldn't be happy if I was one of those other customers, if I was sitting back and had to scream and yell before AT&T gave me the same types of services and prices that

(continued on page 38)

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This showcase of Integrated Services Digital Network applications, co-sponsored with Southwestern Bell Telephone Co., runs

concurrent with ICA's enormous Exposition in the Dallas Convention Center, May 2-4. Hundreds of suppliers will bring their technological expertise to ICA. In turn, ICA will share its base of knowledge and experience in technical sessions addressing international telecommunications, fiber optic technology, emerging standards, ISDN and more.

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IBM implements 5% price hike

continued from page 11

and \$11.25 per share. Revised Wall Street estimates now predict earnings of \$10.50 to \$10.75 per share. Even these new estimates represent a significant increase over IBM's 1988 earnings of \$9.80 per share.

Gould of New Japan Securities said the concurrent price and earnings announcements were an unfortunate combination for IBM. The move shows "IBM is concentrating on [profit] margin, possibly at the expense of market share," he said.

Ressinger of Duff & Phelps called the timing of the IBM announcements "a bit of an anomaly." He said there could be some softening of demand this quarter. "When this happens," Ressinger said, "companies usually want to stay competitive and keep their prices down." □

TELECOMMUNICATIONS

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Worth Noting

"Of the 800 largest telecommunications users in the country, 737 use US Sprint. More than 10% use us as their primary carrier, up from less than 1% just 2½ years ago."

William Coyne
Vice-president and general manager
Northeast Division
US Sprint
Communications Co.
Kansas City, Mo.

Canadian electric company preps new analog fiber net

Utility's system will offer more capacity, reliability.

By Jim Brown
New Products Editor

WINNIPEG, Manitoba — Manitoba Hydro is nearing completion of an analog fiber-optic network that will improve the reliability of communications between nine power substations and a central power distribution control center here.

The ring-configured network is used to pass vital power distribution monitoring and control signals between substations and the power distribution control center, as well as to support voice communications between central-site and substation staff. The control signals let central-site operators detect and correct high-voltage power-line failures.

The fiber loop, which consists of 83 miles of fiber strung on poles across some parts of the city and buried in others, replaces a 20-year-old 6-GHz microwave system. The new network supports as many as 600 voice-grade channels and data at speeds up to 9.6K bit/sec.

More capacity

The network provides Manitoba Hydro with more capacity than it needs and will be adequate to

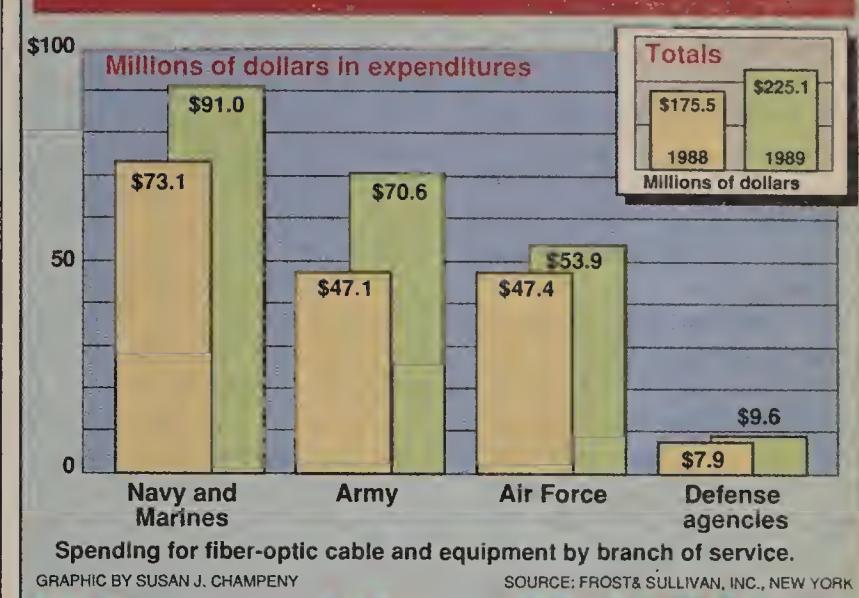
serve the utility's needs for the next 20 years, said Ron Zink, senior communications design engineer. "We felt fiber was the wave of the future, and it was comparable in price to radio systems," he said. "The fiber system will provide more reliability and capacity" than the microwave system.

Reliability is important to the utility, which provides power to the province of Manitoba and exports electricity to U.S.-based utilities. When problems occur in high-voltage power transmission lines carrying as much as 500K volts of power, automatic relays must be able to transmit control signals back to the central site.

Relays are used to address problems concerning power-line cuts, transformer malfunctions, circuit breaker failures or transmission line overloads. When relays are tripped, supervisory terminals at the substations transmit alarms to a control terminal at the central site, which can then issue commands to initiate corrective actions.

Reliability is also important because control operators must be able to establish voice links (continued on page 14)

Uncle Sam wants fiber



GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: FROST & SULLIVAN, INC., NEW YORK

FCC's access charge plan draws criticism

The new order is designed to equalize charges but it may encourage bypass and disrupt users.

By Anita Taff
Washington Bureau Chief

The FCC is scheduled to restructure carrier access charges next week, a move that could cripple some resellers, encourage bypass and disrupt users, according to several alternative long-distance carriers and one regional Bell holding company.

The order, issued in December, calls for changes in the pricing of access charges paid by long-haul carriers to the RBHCs for handling the local portion of calls. Access charges are paid to the RBHCs for originating and terminating long-distance calls.

Critics of the changes asked the Federal Communications Commission earlier this month to either reject or reconsider the order, which is slated to take effect April 1.

In 1986, the FCC set the terminating charge at 4.33 cents per minute and detailed a plan to pare originating access charges over time to reduce the threat of bypass. By 1988, the originating charge was reduced to zero, and the terminating charge was still about 4 cents per minute.

In April, the FCC will increase the originating charge to .1 cent per minute of use and reduce the terminating charge to between 1 and 3 cents per minute of use, depending on each RBHC's cost of termination.

The FCC decision to move toward more equalized access charges was prompted by administrative difficulties in determining whether users were being charged properly. The FCC concluded this would not significantly increase bypass, which the zero originating charge was originally

designed to prevent.

The access charge was levied on the terminating side of the call because outbound traffic is typically destined to many different locations, which makes bypass impossible. The FCC believed it would be easier for users to aggregate traffic on bypass facilities from the point where the call originated.

Earlier this month, the Alternative Carrier Telecommunications Association (ACTA) asked the FCC to suspend the April 1 change and review the matter. The association is critical of the FCC order, saying it fails to re-

ACTA said the order fails to require carriers to pass savings along to customers.



quire carriers to pass along to customers the savings from reduced access charges.

The cost of access charges is built into long-distance rates, so current prices reflect the 4-cent termination charge. The problem, according to Charles Helein, counsel for ACTA, is that even though long-haul carriers' termination costs will go down by 1 to 3 cents per minute under the new rules, the FCC does not require all carriers to pass the savings along to users.

Only AT&T is required to pass (continued on page 14)

Carrier Watch

US Sprint Communications Co. recently discussed plans to upgrade major portions of its 20,000-route-mile nationwide fiber-optic network.

Currently, backbone transmission routes operate at 565M, 1.2G or 1.7G bit/sec, depending on network traffic requirements, according to the carrier.

By installing new electronics and switch software, US Sprint will upgrade the backbone routes to 2.4G or 4.8G bit/sec between 1989 and 1991. The fiber net backbone is made up of 14 major loops that provide rerouting paths during outages.

Smaller spur routes extend into local access and transport areas. They currently operate at either 409M or 565M bit/sec, but will be upgraded to run at 565M to 1.2G bit/sec.

Fiber technology enables US Sprint to expand its network, modifying and optimizing the system to take advantage of new technologies without rebuilding the entire physical plant, the carrier said.

Swiss authorities, invoking a new data protection law, are eliminating certain search options on the country's electronic telephone directory service — the Elektron- (continued on page 14)

WASHINGTON UPDATE

BY ANITA TAFF

Congress plots to take control of telecom.

Members of the House Subcommittee on Telecommunications and Finance held a closed-door meeting last week to set priorities for action on telecommunications issues. According to a congressional aide who attended the meeting, the legislators set their sights on getting telecommunications regulation back under their jurisdiction. The subcommittee members made the issue their No. 1 priority for the year.

The aide said subcommittee members feel that U.S. District Court Judge Harold Greene, who oversees the regional Bell holding company Consent Decree, wields too much power over the industry.

Two prominent congressmen, Rep. Al Swift (D-Wash.) and Rep. Thomas Tauke (R-Iowa), backed earlier legislative efforts to free the RBHCs from restrictions on manufacturing and the provision of information services. The congressional aide said the two representatives advocate reintroduction of the legislation.

But Rep. Edward Markey (D-Mass.), chairman of the Telecommunications and Finance Subcommittee, has not indicated how far he thinks legislation should go in relaxing restrictions on the RBHCs.

Markey is expected to schedule a hearing on the issue of RBHC business restrictions in April. After that, subcommittee members will meet with interest groups representing the information services, manufacturing and interexchange industries to discuss changes in Consent Decree prohibitions. The RBHCs are also prohibited from offering long-distance services. □

US Sprint's new system to allow customized billing

By Sarah Vanderschaf
West Coast Correspondent

NEW YORK — US Sprint Communications Co. will later this year complete installation of a new invoice system that will enable the carrier to offer customized billing, the crowning piece of an effort to revamp the company's billing system.

In a recent interview here with *Network World*, Cliff Hall, executive vice-president and chief information officer of US Sprint's Information Management Division, reiterated earlier assurances that the company has cleared up its billing problems. "We're accurate, complete and timely," Hall said.

Some US Sprint customers confirmed that the worst of US Sprint's billing problems appear to be resolved.

"They're a lot better than they were," said Ted Hackmann, voice services manager at Weyerhaeuser Information Systems in Tacoma, Wash.

"I've noticed an improvement over the past three to four months," Hackmann said his bills

now arrive on time and have fewer errors.

Debra Carpenter, manager of corporate services at Priam Corp., a disk drive maker in San Jose, Calif., agreed with Hackmann. Carpenter deals with as many as 40 long-distance bills each month from various carriers. "It's taken us a long time to get over it, but we have. US Sprint has been very supportive. Their people are wonderful."

Carpenter said US Sprint's bills still could be easier to read, a problem the carrier intends to address when it overhauls its invoice system. The new system, which is slated for completion in the third quarter of this year, will enable customers to dictate the appearance of their bills.

Hall cautioned, however, that the cutover to the new billing system may take some time for larger accounts because they use more services, each of which has to be linked to the new billing system.

Hall said he expects most customer cutovers to the new system to occur without incident because

US Sprint has already replaced about 700,000 lines of code in its billing management system.

US Sprint implemented most of those software changes in January, redesigning the methodology it uses to handle call-detail records. The new software collects data from network switches and constructs call and rate billing information for that data, Hall said.

“What we've done will allow us to introduce services more rapidly than before," Hall said.

▲▲▲

"What we've done will allow us to introduce new services more rapidly than before, without the need to reconfigure the entire network," he said.

US Sprint is now billing its customers for current usage, Hall said. By contrast, a year ago, some customers were receiving statements two months after they were due. When the bills did arrive, many users challenged their

accuracy.

Last summer, the Federal Communications Commission sent a letter to then company president Robert Snedaker criticizing the carrier for not resolving its billing shortcomings ("FCC chides US Sprint for ongoing billing problems," *NW*, Aug. 1, 1988). John Kosar, who handles telecommunications for Trans World Airline Co.'s St. Louis reservations system, said he canceled US Sprint service about eight months ago "because the billing was screwed up, service wasn't what I expected and I got better prices from other providers." US Sprint contacted him recently in an attempt to bring him back into the fold, but Kosar declined.

"There's still some lingering doubt that we're back to a suitable level of doing business, but we have enough referrals who are willing to spread the word," Hall said. "It's just going to take time."

The partial award of the government's Federal Telecommunications System (FTS) 2000 to US Sprint is evidence that the carrier has cleaned up its billing management mess, Hall said. US Sprint would not have won the award if it did not have a working, dependable billing setup, he added. □

Bell Labs tests ISDN conferencing

By Barton Crockett
Senior Editor

MURRAY HILL, N.J. — AT&T Bell Laboratories is experimenting with an ISDN-based, interactive videoconferencing system that enables workstation users to see and share data files with as many as eight other people.

The experiment, dubbed Rapport, is part of a two-year effort by the group to research ways to use Integrated Services Digital Network and video technology to support conferencing.

"We want to emulate as much as possible an actual conference environment," said Sudhir Ahuja, department head for integrated computer communications systems research at AT&T Bell Labs.

In the Rapport experiment, AT&T Bell Labs has linked up to eight AT&T personal computers and Sun Microsystems, Inc. workstations in a simulated ISDN net. The computers have been altered to handle full-motion video. They have also been equipped with customized applications and operating system software and linked to speakerphones.

Workstation users can see each party in the videoconference on the upper half of their computer screen. These video images are carried over one of the two 64K bit/sec ISDN channels in the simulated network. Currently, the network only supports still-life images, Ahuja said, but the company plans to support full-motion video using compression techniques.

The lower half of the computer screen is divided into windows that can show applications, such as spreadsheets, that other participants have up on their screens. The windows can also display an application the user is working on or other videoconferences the user wants to monitor.

Ahuja said the data concerning the applications is multiplexed and carried over the same ISDN channel as the video traffic.

Participants in the videoconference are given a cursor that is color coded or named after them. This cursor can be seen by each participant. Users can move the cursor with a mouse to point at fields on the screens of other users.

The data for the cursors is carried over the ISDN signaling channel. Voice conferencing is supported on the other 64K bit/sec ISDN channel.

He said he "has no way of knowing when and if" AT&T will sell a product based on Rapport. He added, however, that since "the technology for this exists now, my guess is that a vendor will release a product like this in the near future." □

FCC's plan draws criticism

continued from page 13

through access charge reductions by lowering rates, but most resellers do not use AT&T, Helein said. The end result is that the resellers could continue to pay 4-cent termination charges plus the new 1-cent origination charge, he said.

The increased cost of access could drive reseller profits down by as much as 17% in 1989, according to ACTA's filing. Such losses could drive some carriers out of business, Helein said.

Corporate users may also be cheated by the new access charge structure because, even though they will not be subject to the new 1-cent origination charge, carriers may not pass on the savings in termination charges.

Helein said he had spoken to both MCI Communications Corp. and US Sprint Communications Co. and neither had committed to pass access charge decreases

along to customers.

US West, Inc. asked the FCC to reconsider its order due to two concerns: stimulation of bypass (to avoid the 1-cent per-second origination charge) and marketplace disruption for customers.

The increase in origination costs will prompt more users to move to private-line facilities, which are not subject to the charges, said Robert Jackson, director of federal relations at US West.

Large shifts of traffic off the public switched network could cause substantial price swings for those customers remaining on the public network, he said.

Although US West is the only RBHC to formally ask the FCC to reconsider its order, Nynex Corp. filed comments in support of US West's position. Jackson said he expects more RBHCs to join the battle against the access charge changes.

Both ACTA and US West said they were unsure when the FCC would act on their filings. □

Canadian electric co. preps net

continued from page 13

dant microwave towers, microwave transmitters capable of transmitting signals at different frequencies and alternate routing via leased lines.

In addition to the increased reliability and capacity, the new analog fiber network enables Manitoba Hydro to continue using existing analog frequency-division multiplexers.

The mix of monitoring equipment, data terminals and telephones at each substation and the central site are linked to an existing analog frequency-division multiplexer at each site. Those multiplexers feed a baseband signal to a Western Multiplex Corp. System 5600 Loop Protection Switch, which is in turn linked to a TeleSciences Transmission Systems, Inc. Avantek ALW-600 analog light-wave transmitter and receiver.

The Avantek ALW-600 fiber transmission system uses a laser light source and generates an 18-MHz signal that changes in intensity to simulate analog frequency modulation, a technique called intensity modulation.

The Loop Protection Switch is what detects a fiber cut and sends signals in other directions.

Manitoba Hydro is looking to expand its use of fiber throughout the province. "The possibility exists for using fiber more as we become more familiar and comfortable with it," Zink said.

The utility recently approved another 15-mile fiber run to support substations located just outside Winnipeg. Substations in the rest of the province will remain on a microwave network. □

Carrier Watch

continued from page 13

isches Telefonbuch. Users equipped with a terminal and modem have been able to connect to the service, which has been offered by the Swiss telecommunications authority since February 1988.

In addition to providing subscribers' telephone numbers, search options offered by the service have made it possible to learn such personal information

as the individual's profession and maiden name.

New data protection regulations outlawing such searches will take effect April 3.

Users already have the option of choosing whether to include their maiden name, middle name and occupation in the phone directory.

In addition, if they want to prevent ad mail or crank phone calls, they may select an option specifying that they do not want to receive advertising. □

This configuration also limits the number of substations that are unable to communicate with the central site following a cable cut. A cable cut that affects the fiber feeding into and running out of a substation would only disable that substation; the others would remain on-line.

With the microwave network, a failure in one tower cut off communications to all substations that relied on that tower. To get around that problem, the utility had to rely on expensive redundant

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

The vaunted LU 6.2 hasn't gone anywhere in the marketplace. Given that LU 6.2 is strategic [for IBM] — it represents peer-to-peer computing — it's vital that IBM achieve a higher degree of acceptance for LU 6.2."

Steve Wendler
Program director
Office information systems
Gartner Group, Inc.
Stamford, Conn.

Data Packets

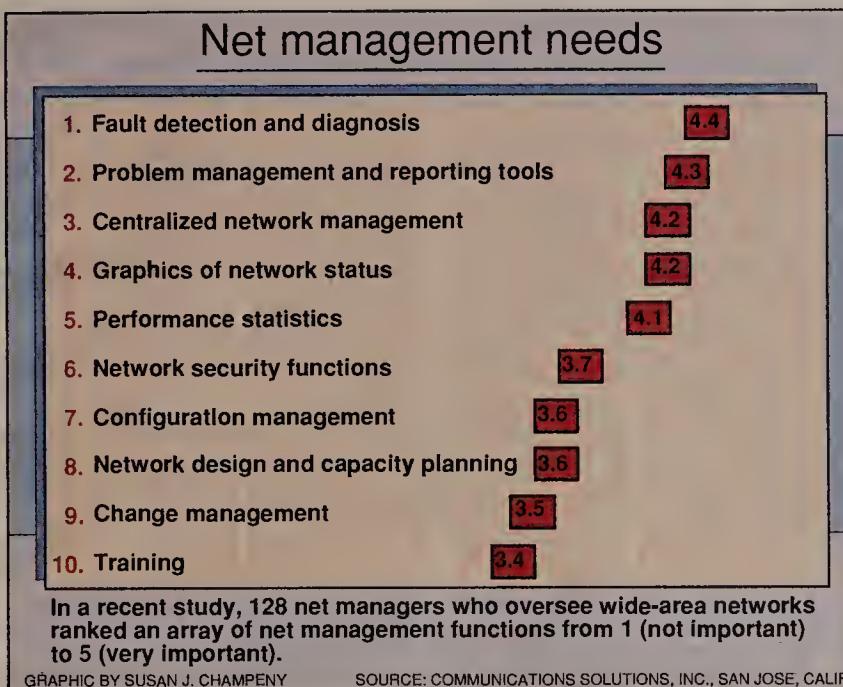
Avant-Garde Computing, Inc. recently announced a new release of its Net/Command network management system that includes a graphics interface based on a **Sun Microsystems, Inc.** workstation.

Net/Command Release 2.0 allows for multiple simultaneous color displays through user-defined windows on the Unix-based Sun workstation. Previously, the software ran on a Unisys Corp. Sperry PC/IT workstation, an IBM Personal Computer AT-compatible workstation that runs under MS-DOS or Xenix. Avant-Garde said it switched to the Sun workstation because it is an industry standard for net management.

Net/Command connects to more than 35 voice and data tools and emulates over 15 types of net management consoles from other vendors' systems. The Sun workstation is attached to the network management systems it supports by an IEEE 802.3-based Ethernet local network.

Available now, the price of Net/Command Release 2.0 varies from under \$100,000 to more than \$500,000, depending on configuration.

Avant-Garde is located at 8000 Commerce Pkwy., Mt. Laurel, N.J. 08054, or call (609) 778-7000. □



Fortune 1,000 firms favor centralized management

Survey respondents detail their network needs.

By Paul Desmond
Staff Writer

SAN JOSE, Calif. — More than 75% of the Fortune 1,000 companies that responded to a recent survey said they have already started to centralize management of their wide-area networks or plan to do so within five years.

The ability to detect faults and diagnose problems were two of the respondents' most pressing net management needs, followed by the ability to track recurring problems. The need for artificial intelligence tools to automate network management came last on users' lists.

The survey, which included responses from 128 network managers at Fortune 1,000 companies and government offices, was

In fact, it tied with the need for a graphics interface as users' third most pressing network management need.

"Up until now, IBM has been thinking that graphics is a bell and whistle," said Marianne Cohn, managing editor of *Network Management Perspective*. "But they're beginning to realize how important it is to users, and they're really pushing to get it out."

The highest priority item, fault detection and diagnosis, reflects the basic reason for network management: to provide the means to keep the network up and running, the survey said. Problem management, the second most pressing need, helps network managers identify and address recurring problems.

For the present, users are not so concerned about artificial intelligence and integrated voice/data management because they want to take care of the urgent and second-tier needs, Cohn said.

The second-tier needs, in order of ranking, are: network performance statistics, security, configuration management/network design tools, change management, training, assets management and call accounting/call optimization.

With 62% of all survey respondents, IBM's Systems Network Architecture was the clear choice as the base architecture for users' wide-area network management systems.

Net management systems based on International Standards Organization protocols — none of which are completely defined yet — were ranked as the second most desirable net management choice at 11%. Systems based on the Transmission Control Protocol/Internet Protocol and in-house systems each had 5%. □

The ability to detect faults and diagnose problems were the most pressing needs.



conducted by *Network Management Perspective*, a monthly newsletter published by Communications Solutions, Inc., a 3Com Corp. subsidiary based here.

Of the respondents who said they plan to implement centralized network management systems (78% of those polled), 38% said they will do so within 12 months. Another 55% said they will install them in one to three years. Only 7% are willing to wait three to five years.

The ability to centrally manage networks was not, however, the top priority cited by the users.

DG network strategy heralds standards

Data General aims to supply software-based services to end users on a multivendor network.

By John Cox
Senior Editor

WESTBOROUGH, Mass. — Minicomputer maker Data General Corp. has launched a new network strategy based on open systems standards, high-performance hardware and a development environment for distributed applications.

The strategy is designed to create a network that supplies software-based services — such as electronic mail, document conversion and filing — on dedicated servers to users in a multivendor network. Users will not have to establish local or remote connections between multivendor processors because the network will automatically handle those operations.

"It's a thrust by Data General in two directions: open systems and high functionality in applications," said Steve Wendler, program director of office information systems at Gartner Group, Inc., a research firm in Stamford, Conn. "As a strategy, you have to give them an 'A.' It's exactly what end users are looking for."

For the effort to succeed though, DG's strategy must take

into account current network environments. "DG can't presume to own the corporate network," said Judith Hurwitz, a senior analyst with Patricia Seybold Office Computing Group in Boston. "They need a strategy that will meld with what already exists."

The company is counting on Open Systems Interconnection support, a new hardware architecture and a distributed application development environment to satisfy that requirement.

"DG's biggest challenge is maintaining connectivity through OSI [support]," said John Dunkle, a vice-president with Workgroup Technologies, Inc., a Hampton, N.H., computer market research firm. "Then [they must] build off of their hardware platforms."

The first element in DG's strategy is support for the emerging OSI network protocols developed by the International Standards Organization.

Early last month, DG announced its OSI Communications Architecture and released a number of new OSI products ("DG unveils multivendor net strategy,

(continued on page 16)

National Weather Service asks Congress for new net

By Wayne Eckerson
Staff Writer

WASHINGTON, D.C. — The National Weather Service is asking Congress for \$1 billion to overhaul its nationwide network of radars, weather satellites and field offices to improve the accuracy and lead time of weather forecasts.

The network will enable the Weather Service to make forecasts 10 days in advance, compared to four or five days today. It will also make it possible to issue tornado warnings up to 30 minutes before a twister, compared with the one- or two-minute warnings typical today, according to Louis Boezi, director of the Transition Program Office at the National Weather Service.

The price tag for the Advanced Weather Interactive Processing System (AWIPS) network includes the cost of 160 Doppler radars, a series of new satellites, several Class VII supercomputers, 1,000 computerized

weather sensors and other network facilities and equipment.

The sensors, called automated surface observing systems (ASOS), are microcomputer-based devices that control 12 weather-sensing instruments. The ASOSs will be distributed nationwide to gather temperature, wind speed, pressure and other weather measurements every 10 minutes and will then feed that information into forecast offices.

Boezi said workers at forecast offices today spend as much as half of their time taking weather readings. ASOSs will eliminate the need to take manual readings, save on labor costs and provide more accurate and frequent readings.

The sensors, in fact, will make it possible to consolidate 250 forecast offices into 115 offices, Boezi said. Geographical areas that lose a weather station due to the modernization effort will actually be given equal or improved

(continued on page 16)

DG network strategy heralds standards

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OSI products," *NW*, Feb. 13).

"The fundamental architecture is all OSI-based," said Colin Crook, senior vice-president of DG's Communications Systems group. The company's directory services products support the X.500 standard, and its message-handling and document exchange offerings support X.400, he said.

The result, according to Crook, is that future services and processors can be incorporated into customer networks with minimal effort and without any adverse impact on users.

Until it fills out its OSI product line, DG melds its products with non-DG environments by supporting existing de facto communications standards, such as the Trans-

mission Control Protocol/Internet Protocol, and an array of IBM protocols, such as Synchronous Data Link Control. Earlier this month, DG became the first hardware vendor to declare support for IBM's Common Programming Interface — Communications. That specification is intended to simplify communications between applications residing on different IBM processors by using the LU 6.2 protocol, said Joe Clabby, DG's communications sector marketing manager. DG can also adapt the interface to establish communications between applications on its processors and IBM computers, he said.

The second element in DG's communications strategy is its new AviON comput-

er architecture, which uses the Motorola Corp. 88000 Reduced Instruction Set Computing (RISC) microprocessor in a new family of high-powered workstations and network servers. DG claims, and analysts agree, that the new systems reduce the cost per million instructions per second to about \$500, currently the lowest in the industry.

Coupled with DG's new version of Unix, reworked specifically for offices instead of engineering environments, the AviON systems enable customers to add low-cost, high-performance processors to their networks. These processors can support a battery of network services for end users.

DG is betting AviON will lure an army of value-added resellers that will port existing applications to the new architecture.

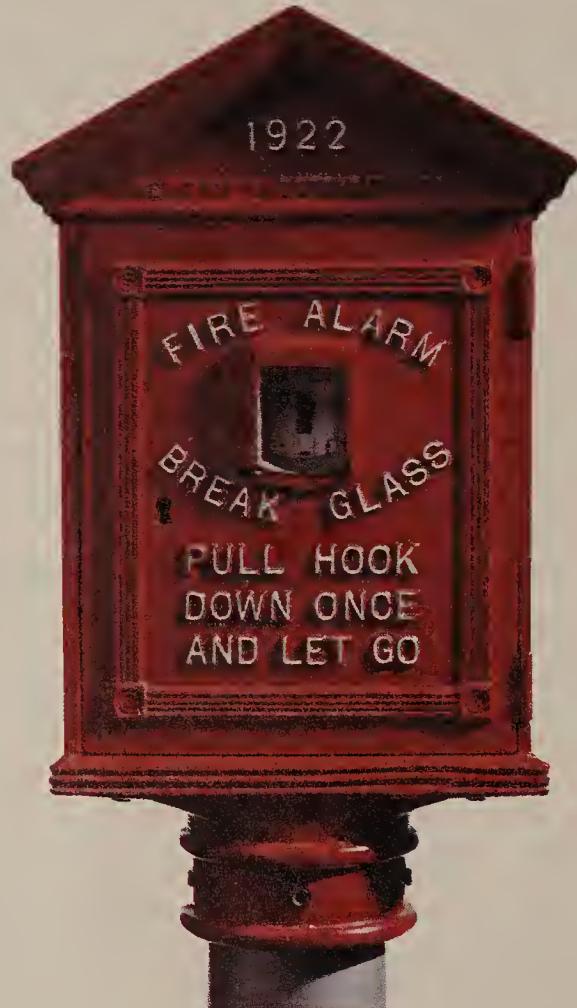
To ensure this application explosion,

DG announced with the AviON architecture its new Distributed Applications Architecture (DAA), which is a set of programming interfaces and specifications that lets applications talk with one another no matter what computers they reside on, anywhere in a network.

In DG's scheme, a DAA network takes over from the end user, tasks such as messaging, as well as file- and document-conversion services. These services would be handled automatically by the network, according to Chris Stone, DG's group manager for office systems software. "The customer who's using this [environment] doesn't see [the underlying operations]," Stone said. "He has a unified view of data that's distributed across a variety of services."

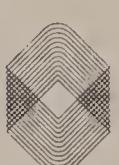
DG's strategy sounds right to Lionel Rickford, manager of planning and technology development for the Market Services division of Westinghouse Electric Corp. in Pittsburgh. "Data General is making all the right noises," he said. "Our position is that we prefer the open systems direction, with connectivity to heterogeneous worlds. That's what we want."

"I needed a WAN company that could handle my problems at 2AM. That's where Vitalink offers a clean break from the rest."



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Weather Service asks Congress for net

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service because the new systems will provide more information more frequently, Boezi said.

AWIPS will use 1.5M bit/sec satellite links to connect the 115 regional forecasting offices to supercomputers at the National Meteorology Center here. Forecasting offices will be linked with 56K bit/sec dedicated facilities. The Weather Service's current network is based on 2,400 bit/sec links.

Weather patterns, trends and national weather forecasts generated at the center will be distributed back to weather stations via AWIPS, enabling meteorologists to generate regional forecasts, Boezi said.

The new Doppler radars will replace 20- to 30-year-old radars that only detect precipitation, Boezi said. The Doppler radars, made by Unisys Corp., will detect the area, type and quantity of precipitation and wind patterns. They will also calculate the speed and direction of severe weather patterns, Boezi said. Most of the radars will be set up near National Weather Service forecast offices.

Ford Aerospace Satellite Services Corp. has been contracted to provide new weather satellites that will offer regular and infrared images of the earth's weather patterns. The satellites will provide close-up image shots of specific regions of the country. In addition, they will detect water vapor content and provide temperature profiles of the atmosphere — capabilities that were previously unavailable.

Once AWIPS is in place, all weather offices will have electronic access to satellite images. Today, only 50 offices have this capability, Boezi said.

If approved by Congress, the network will be in operation by the mid-1990s. Congress has already approved funding for parts of the network in previous budgets, but it still needs to approve the plan as a whole.

Competitive contracts to design AWIPS were awarded in November to two teams, one headed by the Government Information Systems division of Planning Research Corp. in McLean, Va., and the other by Computer Sciences Corp. of Falls Church, Va.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANs, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

BY the end of 1988, there were 766,940 personal computer local nets installed worldwide. Thirty-three percent, or 253,000 of those nets, were Apple Macintosh nets running on LocalTalk cabling."

Richard Villars
Local network analyst
International Data Corp.
Framingham, Mass.

Netnotes

Fibronics, Inc. recently introduced Version 2.0 of its network management software for the Fibronics Advanced Cabling System (FACS) fiber-optic product family.

The latest software enables network managers to monitor more than 30,000 devices in any single local network from their desktops.

In contrast, the prior version of the FACS net management software was capable of monitoring 15,000 devices.

FACS Version 2.0 management software resides on an IBM Personal Computer configured as a dedicated management station. It lets system administrators remotely isolate problems anywhere on the network.

"Previously, network managers could only solve network problems by being at the scene of the faulty device," said Hal Spurney, Fibronics' director of marketing.

Version 2.0 also offers enhancements over Version 1.0, such as a user-friendly on-line help facility to guide network managers through problem isolation, an event description facility to assist them in troubleshooting and identifying particular problems, and FACS net management software housekeeping facilities such as printer and alarm controls.

Additionally, Spurney said, Version 2.0 features improved graphic editor control tools. Priced at \$495, FACS net manager

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Infotron offers DEC LAT option for the Commix 32

Server can now link DEC terminals, PCs, Macs.

By Laura DiDio
Senior Editor

MOUNT LAUREL, N.J. — Infotron Systems Corp. recently introduced a new option for its Commix 32 communications server that provides support for Digital Equipment Corp.'s Local Area Transport (LAT) protocol.

With LAT support, the server can link DEC terminals, personal computers and Apple Computer, Inc. Macintosh systems to a DEC host processor. The Commix 32 server attaches to a single Ethernet port on the DEC host, and terminals and workstations are linked to the server via serial I/O ports, said George Greene, president and general manager of Infotron's LAN Systems Division.

LAT is a proprietary DEC protocol that enables terminals and personal computers to communicate with or access a DEC host via Ethernet.

Previously, users needed separate servers, one for personal

computers and one for terminals, to connect their personal computers and terminals to a DEC host computer. Users that wanted to connect personal computers to DEC terminals and hosts had to buy an Ethernet adapter board, separate LAT software and a personal computer local network file server, Greene said.

"This type of configuration typically costs about \$11,000 to \$15,000, and it's cumbersome because it's actually two separate networks running on the same Ethernet cable," he said.

By contrast, Greene added, a 32-user configuration of the Commix 32 with the LAT protocol option costs less than \$8,000, or about half the price of alternative products.

Companies such as Emulex Corp., Interlan, Inc., Sytek, Inc. and DEC also sell LAT terminal servers. But in order to connect personal computers to the DEC

(continued on page 19)

Halley Systems unveils token-ring net brouter

By Laura DiDio
Senior Editor

SAN JOSE, Calif. — Halley Systems recently introduced the first member of its ConnectLAN 200 remote token-ring brouter family.

The ConnectLAN 210 token-ring brouter lets users link several of the same vendor's token-ring nets at a single premises. The brouter also enables users to interconnect token-ring nets from several vendors.

ConnectLAN 210 combines routing functions with the added ability to transfer data and electronic mail among disparate 4M bit/sec remote token-ring local networks, regardless of what protocol they support, said Halley President Zvi Alon.

The ConnectLAN 210 brouter links IBM, Novell, Inc. and 3Com Corp. token-ring nets.

The brouter also provides users with network management capabilities, Alon said.

Source and non-source

Halley officials said the token-ring brouter is the only such device available that processes both source-routed data and non-source-routed data packets.

IBM's token-ring data packets are source-routed, which means the transmitting node determines

the route the data packet will take to reach the destination or receiving node.

By contrast, Novell, 3Com and other companies use non-source-routed packets, where the brouter "learns" the network topology and then performs all the routing functions to guide the data packets to their intended destination.

Both IBM and Proteon, Inc. offer routers and bridges, but they only connect IBM Token-Ring Networks and not third-party token-ring nets such as Novell or 3Com offerings.

The ConnectLAN 210 brouter is also protocol-independent. Regardless of whether the various token-ring nets linked by the brouter are running Transmission Control Protocol/Internet Protocol, Systems Network Architecture, DECnet or Open Systems Interconnection protocols, interconnected token-ring nets appear as if they are one network.

The result is that users on separate multivendor token-ring nets can communicate, exchange data and share computing resources as though they were on the same local net.

In addition to internetworking a variety of token-ring nets, the ConnectLAN 210 brouter trans-

(continued on page 19)

AS/400 as an application server

OS/2 Extended Edition

AS/400 server

DOS

OS/2 LAN Manager

IBM's Application System/400 servers will sit on a token-ring network and enable PCs running OS/2 or DOS to tap directly into the minicomputer to access office automation and data base applications.

Software required:
■ AS/400 PC Support
■ OS/2 Extended Edition
■ OS/400

Protocols supported:
■ LU 6.2
■ NETBIOS

Users supported:
■ More than 200
■ LAN connection:
■ IBM Token-Ring Network

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: IBM, ROCHESTER, MINN.

IBM sets up AS/400 as application server

Planned software enhancement will give OS/2 net users access to minicomputer applications.

By Laura DiDio
Senior Editor

ROCHESTER, Minn. — An IBM official last week said the company is planning to offer its Application System/400 (AS/400) minicomputer as an application server for networks of OS/2 Personal Computers.

IBM will introduce an enhanced version of its AS/400 PC Support software that will work with networking features of the OS/400 operating system to enable the minicomputer to act as a server for OS/2 Extended Edition and OS/2 LAN Manager local nets, said Janet Krueger, an IBM senior programmer for AS/400 products.

The AS/400 could be positioned as one of many servers on an OS/2 net, sitting alongside Intel Corp. 80386-based servers running IBM's OS/2 Extended

IBM will introduce an enhanced version of its AS/400 PC Support software.



Edition or Microsoft Corp.'s LAN Manager.

The AS/400 server could also be used by network managers as a server upgrade replacing 80386-based servers that cannot support extensive numbers of workstations.

IBM is positioning the AS/400 to sit directly on a token-ring net, allowing Personal Computers

running OS/2 or DOS to access AS/400-based office automation and data base applications as peers. This means that Personal Computers would not have to emulate terminals as they now do if they access the minicomputer through a gateway.

Currently, the AS/400 PC Support software allows users to configure the minicomputer as a server for IBM's PC-DOS-based networks. Recently, Novell, Inc. officials told *Network World* they are building software to make the AS/400 a server on NetWare local nets ("Novell promises AS/400 version of new NetWare," *NW*, March 6).

Peering ahead

While Novell's efforts would link the AS/400 to NetWare's large installed base, IBM's plans for AS/400 PC Support enhancements will expand the AS/400 role into OS/2-based nets. One portion of AS/400 PC Support will reside on the minicomputer and a second portion will reside on the Personal Computer, where it will run on top of OS/2 Extended Edition, Krueger said. This software will enable users on DOS, OS/2 Extended Edition and OS/2 LAN Manager nets to access and share files, peripherals and applications directly with AS/400 minicomputers configured as servers.

As part of the enhancements to the AS/400 PC Support software, IBM will offer support for its LU 6.2 peer communications protocol and may also offer support for its Network Basic I/O System protocol, analysts said. While Personal Computer users will be able to access minicomputers

(continued on page 18)

IBM sets up AS/400 as server

continued from page 17

puter applications, terminal users on the minicomputer will also be able to tap the wealth of existing NETBIOS applications and the growing ranks of programs based on IBM's LU 6.2 protocols.

"We currently haven't announced any plans to provide a NETBIOS interface for the

AS/400, but anything's possible," according to Krueger.

Increases user options

The availability of the AS/400 as an application server doesn't spell the demise of 80386-based servers, analysts said.

"The AS/400 server isn't going to kill the market [for 80386

servers]. IBM is increasing users' options, not obviating the need for 80386-based servers running OS/2 Extended Edition," said Don Bellomy, director of processor research at International Data Corp. in Framingham, Mass.

"Long-term, it will take some future business away from 80386 servers running OS/2," Bellomy said. "But right now, it behooves every vendor to have a series of options since many users haven't

decided what level and type of service they expect from their servers."

Krueger declined to comment on the exact date of the product introduction.

However, analysts who attended a recent IBM briefing said they expect the AS/400 PC Support software to debut in May or June.

Krueger did confirm that the AS/400 is key to IBM's overall

strategic plan to provide users with server migration paths. By positioning the AS/400 as an application server for OS/2- and DOS-based nets, IBM would give its users a migration path from its current Personal System/2 server line to a high-end minicomputer server.

"The AS/400 PC Support program will enable users to directly access AS/400 services and applications. It will allow us to sup-

Netnotes

continued from page 17

agement software Version 2.0 is shipping now. It requires a Fibronics NMS FM872 controller and an NMS FM 874 Buffer for installations with more than 16 Universal multiplexers.

Pyramid Technology Corp. is adding Network Computing Devices, Inc.'s X/Window graphic display station to its new line of Unix-based servers aimed at the commercial market.

Under the terms of an OEM contract between the two companies, Pyramid Technology will private-label the NCD16, a one-million-pixel display station that uses a Motorola Corp. 68000 microprocessor to off-load display processing from its Unix host. Network Computing Devices said the two-year contract is valued at about \$5 million.

According to Network Computing Devices, the NCD16 provides "a workstation-like environment at a fraction of a workstation's cost per seat."

Plus Development Corp. said its new Plus Impulse mass-storage system features a Defect Free Interface that eliminates the need to run Novell, Inc.'s lengthy COMPSURF program when installing the system on a NetWare local network.

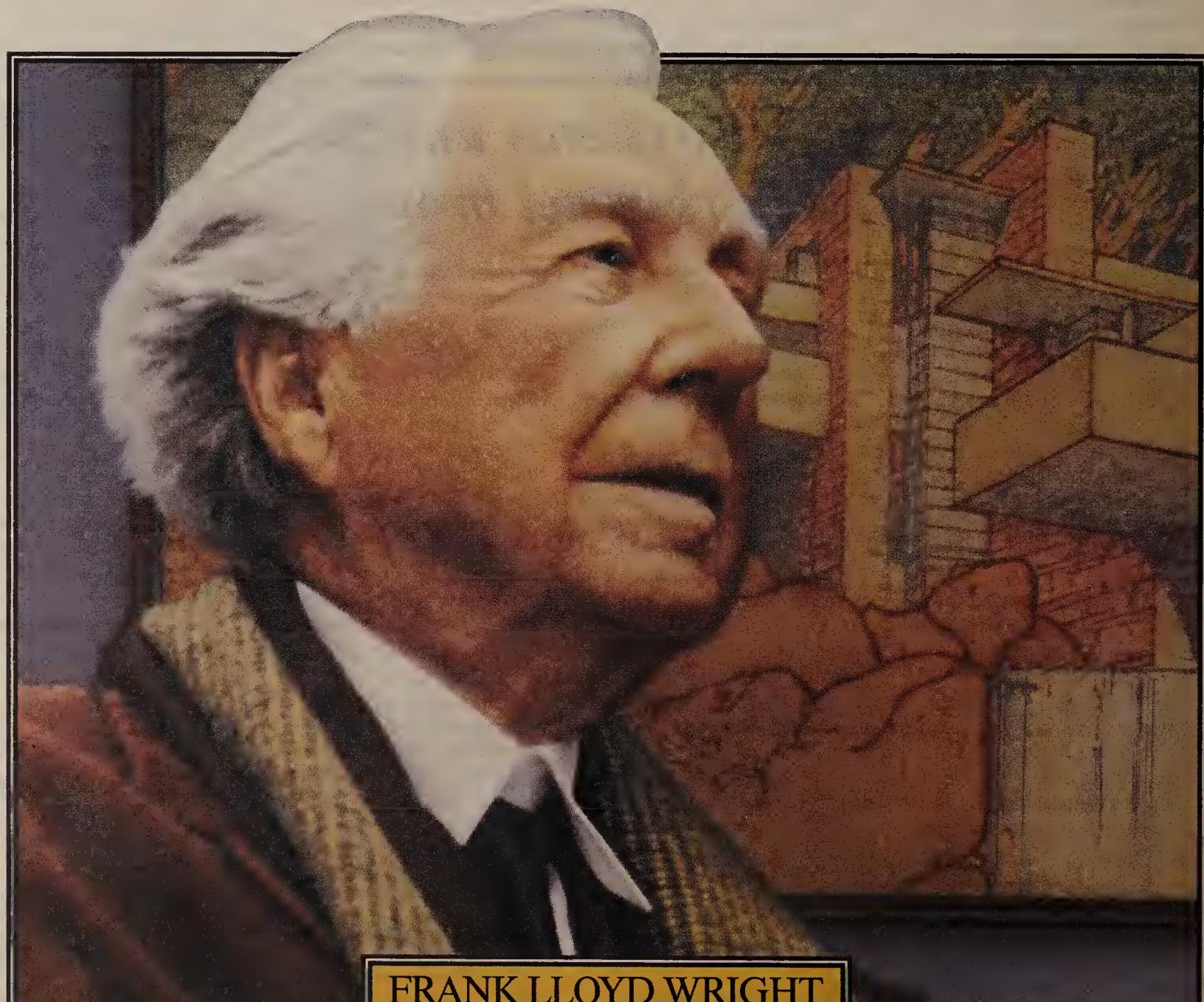
According to Plus Development, the Defect Free Interface has all the capabilities of Novell's HotFix, automatically remapping bad disk sectors with replacement sectors located on the same cylinders.

Additionally, spare sectors are stored in unformatted locations on each drive cylinder, freeing up formatted capacity.

The Impulse hard disk system, released this month, incorporates a Cluster Disk Interface that lets users increase hard disk storage in 40M-byte or 80M-byte increments. Plus Development said one Impulse system can link up to 32 80M-byte drives to a single server, providing as much as 2.6G bytes of on-line storage and an effective data access rate of 12 msec.

The Impulse disk controller is priced at \$295, while the hard disks cost \$895 for the 40M-byte model and \$1,195 for the 80M-byte drive. Each controller supports up to 16 Impulse drives, and two of the controllers can be installed in a server. **■**

We Redesigned The Architecture Of Dial-Up Network Modems.



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Frank Lloyd Wright, American architect, 1867-1959. His pioneering efforts with new materials, systems, and structures overturned the "classically" decorative architectural standards of the nineteenth century—and redefined the concept of "house." Wright's humanistic, functional, open-structure philosophy revitalized the entire field, and his principles have become the essence of modern American architecture.

port a much greater number of users," Krueger said.

Analysts said the AS/400 application server will give Personal Computer users true peer connectivity into IBM's minicomputer applications.

"The application is the overriding entity," said Frank Dzubek, president of Communications Network Architects, Inc., a consulting firm in Washington, D.C. "The AS/400 application

server will give hundreds of users access to sophisticated office, document and image applications that they can't presently access given the power limitations of 80386-based LAN servers."

The AS/400 application server will support well over 200 users, or about 10 times the number of users supported by an 80386-based server, and it will allow those users to access data more quickly, Krueger said. □

Halley Systems unveils brouter

continued from page 17

mits data packets at 40,000 packet/sec, Alon said.

Competing vendors' bridge and router products typically cost \$3,000 to \$4,000 less than the Halley brouter, which sells for \$12,995. However, they filter data at only 1,000 packet/sec. The slower bridges often require the user to retransmit files or

messages several times, Alon said.

The ConnectLAN 210 is a self-contained box that attaches directly to the token-ring media access unit. It consists of an Intel Corp. 80286-based personal computer, which comes with two IEEE 802.5-compatible 4M bit/sec token-ring interface cards

and a hardware accelerator adapter that performs filtering and routing functions.

The new token-ring brouter also includes configuration software that enables users to determine and configure brouter options such as packet size, filtering thresholds, level of security access and network management capabilities.

The ConnectLAN 4M bit/sec token-ring brouter is expected to ship in June. A 16M bit/sec version is scheduled to be available in September, Alon said. Pricing on the 16M bit/sec brouter has not been set.

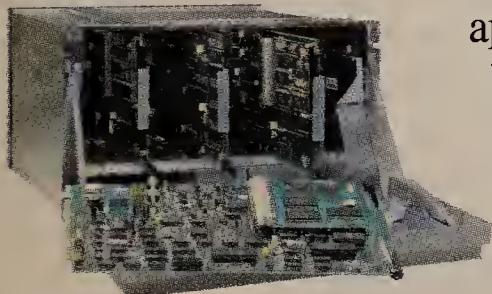
For more information, contact Halley Systems at 2730 Orchard Pkwy., San Jose, Calif. 95134, or call (408) 432-2600. □

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The intelligent front panel offers complete management and diagnostic functions for every modem in the system.

Infotron offers DEC LAT option

continued from page 17

host, users of those vendors' products must buy terminal-emulation software. This method turns an intelligent personal computer into a dumb terminal. The Commix 32 contains a resident terminal-emulation program, but it also lets personal computers function as intelligent workstations.

The DEC LAT protocol resides on software that is located in chips on three adapter boards in the Commix 32, Greene said.

He said there is currently a large market for products that



PHOTOGRAPH © 1989 STEVEN BORN

Infotron's George Greene

connect both DEC terminals and personal computers to DEC hosts. According to the company, there are approximately 28,000 DEC sites that need to connect their 1.75 million personal computers to a DEC host.

"Thus far, only a small percentage of those PCs have established such a connection," Greene said.

The Commix 32 communications server with the LAT protocol option is available in both 16- and 32-port configurations. Both versions include a diskette, manual and 32-user personal computer software site license. The 16-port version sells for \$6,490, and the 32-port version costs \$7,790. Both are shipping now.

For more information, contact Infotron's LAN Systems Division at 130 Gaither Drive, Building 116, Mount Laurel, N.J. 08054, or call (609) 722-5575. □

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Worth Noting

The biggest thing impeding ISDN is that it is new and different. Users would have to make a commitment to change and they don't want to do that."

Walt Roehr
Executive director
Telecommunication
Networks Consulting
Reston, Va.

Expert cites need for int'l trading net

By Barton Crockett
Senior Editor

NEW YORK — Within the next few years, brokerage houses and other financial institutions will join forces to form the first global electronic equities exchange.

That's the opinion of Richard Justice, vice-president of automation at the National Association of Securities Dealers, Inc. (NASD) in Washington, D.C. In a speech at the recent Arthur D. Little, Inc. Trading Technology Conference here, Justice said technology will facilitate the development of an electronic exchange that would allow traders in any time zone or country to buy and sell international equities around the clock via computer.

International equities are a select class of stocks for firms such as IBM that are bought and sold in markets around the world.

With the new exchange, trad-

ers would be able to negotiate trades over the telephone and send in reports of completed deals over networks to a data center run by the exchange. This data center will operate real-time stock quotes and price feeds for traders, as well as centralized trade clearing facilities.

Complementary strategy

Justice's company operates the NASD Automatic Quotation (NASDAQ) stock quote network and over-the-counter stock exchange.

According to Justice, the electronic exchange would not supplant existing stock exchanges. Rather, it would complement these exchanges by providing a more convenient venue for traders to deal in international equities.

The global exchange would be linked electronically to the price quote and order-entry systems of the major equities markets, he said.

A matter of efficiency

According to Justice, this global electronic market will come about because it is more efficient

(continued on page 22)

Association Watch

At the recent kickoff meeting of the **Northern Telecom Lanstar Users Group**, Northern Telecom, Inc. reaffirmed its commitment to support its proprietary Lanstar local net for IBM and compatible personal computers.

Lanstar users had been concerned that Northern Telecom would discontinue the product or sell the rights to another vendor, according to Debbie Sullivan, network analyst at Brigham and Women's Hospital in Boston. Sullivan said she and other users formed the group in order to get Northern Telecom to reveal its plans for Lanstar.

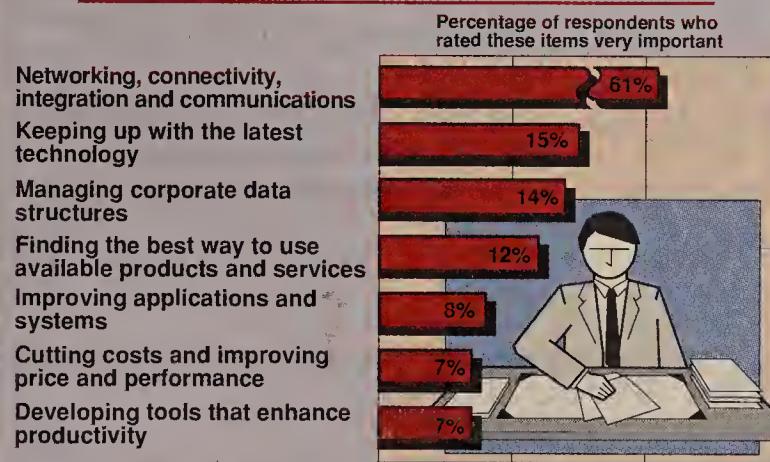
According to Sullivan, a Northern Telecom executive told an audience of about 55 users at the inaugural users group meeting earlier this month that the company had been reevaluating its strategy for the product.

Sullivan said the executive indicated that Northern Telecom plans to move control of Lanstar out of its telecommunications and into its data communications division, but the company will continue supporting the product for the foreseeable future. The executive indicated that rumors of Northern Telecom planning to shelve or discontinue Lanstar are incorrect, she said.

The Lanstar Users Group will hold another meeting during Networld '89, a trade show that will be held Sept. 12-14 in Dallas. For more information, call Sullivan at (617) 732-4798.

EXECUTIVE BRIEFS

The chief information officer's top technical concerns



Figures are based on a survey of 120 CIOs at Fortune 500 companies.
GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: ARTHUR ANDERSEN AND CO., CHICAGO

Managers get down to business. The postdivestiture era has unleashed a wealth of opportunities for companies to wield technology for business gain. But to capitalize on these opportunities, information system executives need to shift their orientation from technical issues to business concerns.

According to a recently issued report, information managers at leading U.S. companies are doing just that.

"The Changing Shape of IS: A Second Look" finds that chief information officers at leading U.S. companies are giving increased attention to business and management issues. As a result, these managers currently play a dual role as business professionals and technicians.

Managers now judge their success by how effectively they educate, train and communicate with management, staff and customers, according to the report, which uses the results of a 1988 survey of 120 top computer executives at Fortune 500 companies.

(continued on page 22)

ISDN pilot test woes don't trouble users

Trial problems encountered by McDonald's; others fail to alter implementation plans of future users.

By Wayne Eckerson
Staff Writer

Problems during several well-publicized Integrated Services Digital Network trials have changed few users' opinions about whether or not they intend to implement ISDN.

Users interviewed by *Network World* said it is not unusual for difficulties to crop up in pilot tests of products and services that are still under development.

Few of them have changed their attitudes about ISDN or delayed their plans for implementing the advanced network services because of problems at recent trials.

But many users said they are concerned about the lack of well-defined ISDN applications and the fact that ISDN is being implemented only in limited geographic areas.

Also, they are still unclear about how ISDN provides an advantage over private networks.

In one of the largest and most closely watched ISDN trials, McDonald's Corp. recently acknowledged that the absence of comprehensive network management tools made it nearly impossible to monitor and diagnose problems with an experimental ISDN network at its corporate headquarters in Oakbrook, Ill.

The Massachusetts Institute of Technology in Cambridge, Mass., encountered several problems last fall when it installed an ISDN-ready AT&T 5ESS central office switch to support 13,000 phones, almost half of which contained ISDN data interfaces.

During the installation, AT&T discovered that many of MIT's phones were located too far from the 5ESS switch to receive ISDN services, forcing AT&T to replace many circuit cards in the 5ESS switch, according to Karen McCarty, manager of operations and administration at MIT. Also, since the installation, many of the ISDN phones "fall asleep" or temporarily fail to work because of intransigent wiring problems, McCarty said.

Not put off

But few communications managers expressed concern about the results of these and other trials.

"We expect any new standards will have problems that eventually get ironed out," said Bob Bystedt, director of telecommuni-

tions services at Rockwell International Corp.

Bystedt likened the evolution of ISDN to the emergence of IBM's Systems Network Architecture in the late 1970s.

Rockwell International made a commitment to move to SNA in 1975, but system bugs and implementation problems delayed the cutover to the network architecture until 1981, Bystedt said.

Questions remain

Other users also said they are not dissuaded by problems that have emerged in ISDN trials. But they question the usefulness of ISDN today.

MIT encountered problems when it installed an ISDN-ready central office switch.

▲▲▲

Bernie Schneider, director of telecommunications at United Stationers, Inc. in Des Plaines, Ill., said his company has delayed its implementation plans for ISDN — not because of mishaps at ISDN trials but because other network services such as T-1, switched 56K bit/sec service and fractional T-1 can provide much the same capabilities as ISDN. In addition, these services are dropping in price, making them a much more attractive investment than ISDN, which has yet to be fully deployed, he said.

Schneider also said ISDN is being offered in only a few geographical locations, which limits its usefulness as a universal means of data transport.

A year ago, United Stationers had scheduled a major ISDN implementation for 1990. Today, that implementation has been pushed back to 1992, Schneider said.

Jerry King, manager of telecommunications technology at General Electric Co. in Bridgeport, Conn., said GE is "cautiously watching" ISDN.

The major stumbling block for GE, King said, is that ISDN offers few applications that aren't already available using the capabilities of a sophisticated private network.

Expert cites need for int'l net

continued from page 21

than existing markets. "While this may sound idealistic, I think markets tend toward efficiency," he said. "This would be a very efficient market."

Currently, brokerage firms operate expensive global networks and computer systems to monitor and trade international equities.

Trading international securities in a single electronic market would save brokerage firms the expense of building and operating these systems, Justice said. These potential savings will encourage trading firms and large financial institutions to participate in this market.

Justice acknowledged that no

firm has yet championed a global electronic market. He added, however, that the global market he envisions would be similar to electronic markets in existence, such as NASDAQ and systems some futures exchanges are building to let their members trade in markets around the world ("N.Y. Merc signs on with Chicago exchange's GLOBEX trading net," *NW*, Jan. 9).

However, some observers dis-

agree with Justice. While they acknowledge that a global electronic equities exchange would be efficient, many say that brokerage firms are reluctant to give up existing systems for trading international stocks.

Money maker

"Brokerage firms have made a huge investment in their global systems, and these systems make them a tremendous amount of

money," said Stephen Levkoff, managing director of the trading-floor systems group at the New York-based brokerage firm Smith Barney, Inc.

Levkoff said that brokerages involved in international trading are able to leverage their networks to execute deals that competitors without such networks are not able to handle. A global exchange would erase that edge, he said. □

Executive Briefs

continued from page 21

Technical issues still require a large part of information officers' time and energy, with networking topping the list, the report said. Sixty-one percent of the survey respondents said networking and communications are the most important technical issues they face (see chart, page 21).

The study was conducted by Andersen Consulting, a division of Arthur Andersen & Co., a Chicago-based market research firm. The study is intended to follow up on a similar report the firm issued in 1986.

The 1986 study indicated that most top information system managers were primarily concerned with staying current with technological advances. In 1988,

Nearly two-thirds said they undertook projects to bolster their competitive position.



more than three-fourths of managers interviewed said keeping pace with business issues is more important than staying abreast of developments in technology.

Nearly two-thirds of the managers interviewed in the latest study said they undertook projects to bolster their company's competitive position or to improve customer service. Also, 73% of respondents said it is very important for information systems to adapt quickly to sudden changes in the industry or to other business factors.

On management issues, 92% of the respondents said good communication with top management, staff managers and end users is very or extremely important.

"The report makes clear that information system executives remain deeply involved with technical and operational concerns, but their time, attention and resources are being increasingly devoted to more global business issues," said Jacque Pasino, director of Andersen Consulting's information planning practice. □

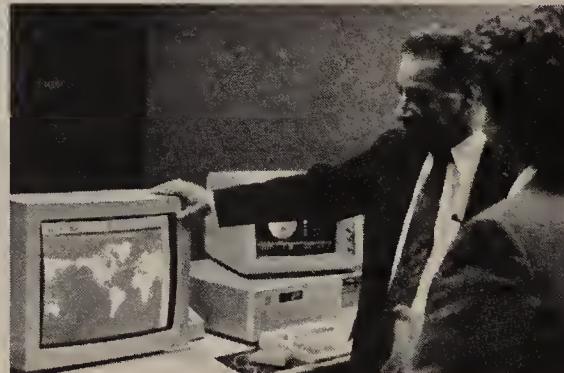
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Worth Noting

Next week: *A Network World* Management Update looks at multimedia networking and mixed-object architecture

First Look

Gateway links to IBM, asynchronous hosts

Adacom Corp. recently announced a gateway capable of linking remote terminals and microcomputers to IBM or asynchronous hosts.

Adagate supports as many as 80 remote IBM 3270 terminals, IBM Personal Computers, IBM Personal System/2s, asynchronous terminals and ASCII printers via dial-up or leased lines. The product has 12 board slots, which support a processor board, two IBM host attachment boards, a board providing up to four asynchronous host links and boards supporting Adacom's remote Adastation, Adalink, Adafile, Adaplex and Adastar devices.

Adastation is a stand-alone unit with two ports that support a terminal or microcomputer and an ASCII printer emulating an IBM 3287 printer. Adalink is a single-port device that connects a stand-alone microcomputer capable of emulating an IBM 3270 and an attached ASCII printer to Adagate. Adafile is software that enables a microcomputer outfitted with a terminal-emulation board and a modem to attach to Adagate. Adaplex and Adastar are five-port units that link as many as five remote terminals or microcomputers to a single Adagate port.

By enabling attached terminals and microcomputers to emulate Digital Equipment Corp. VT-220 or Hewlett-Packard Co. 2392 terminals, Adagate lets users switch connections between the IBM host and asynchronous hosts.

Prices for Adagate range from \$500 to \$1,300 for each remote device.

Adacom Corp., 8871 Bond, Overland Park, Kan. 66214, or call (913) 888-4999. □

Telematics to support T-1 fractions

By Jim Brown
New Products Editor

FORT LAUDERDALE, Fla. — Telematics International, Inc. recently introduced software that enables its T-1 multiplexers to support fractional T-1 services. The company also added two low-end models to its line of Net25 Access Communications Processors (ACP).

With the fractional T-1 software upgrade, customers of Telematics' Digital Wideband Exchange (DX) T-1 multiplexer can use a single T-1 link to a local central office switch to access up to seven fractional T-1 lines emanating from that hub. Fractional T-1 services enable users to lease portions of T-1s.

The DX fractional T-1 software upgrade is available now. The software works with Telematics' Model DX-50, which ranges in price from \$16,000 to \$75,000, and Model DX-500, which ranges in price from \$20,000 to \$150,000. Current DX-50 and DX-500 users can purchase the upgrade for \$3,300.

New models for ACP line

Telematics' new Net25 Series 30 and Net25 Series 20 ACPS can be configured to support asynchronous packet assembler/dissassembler, Systems Network Architecture PAD, switching PAD, multiprotocol PAD or switch/concentrator functions.

For example, software is available that enables an ACP to connect an IBM 3270, IBM 5250 or asynchronous terminal to a public or private X.25 network

With the fractional T-1 software upgrade, customers can use a single T-1 link to access up to seven fractional T-1 lines.



switch. A different software package allows an ACP to act as both a PAD and a low-end X.25 switch.

A base Net25 Series 30 includes an Intel Corp. 80286 microprocessor with 500K bytes or 1M byte of random-access memory. The base unit also includes two V.35 or V.11 synchronous ports supporting X.25 trunks or

local IBM Synchronous Data Link Control devices at speeds up to 64K bit/sec.

The Net25 Series 30 has four expansion slots, one of which can support a synchronous board providing two more V.35 or V.11 ports operating at up to 64K bit/sec.

Alternatively, users can populate the expansion slots with boards that provide eight RS-232 ports for local asynchronous devices operating at speeds up to 19.2K. Users can also set up boards with four RS-232 ports supporting local asynchronous

Users can dedicate a PCP to support network management functions or both net management and X.25 switching functions.



or X.25 devices at speeds up to 19.2K bit/sec.

The base Net25 Series 20 includes an Intel 80186 microprocessor with 500K bytes or 1M byte of RAM. This unit also comes with two V.35 or V.11 synchronous ports and four expansion slots.

Users can populate all four of those slots with V.35/V.11 interfaces or boards providing four RS-232 ports. The RS-232 ports can support local asynchronous, local SDLC or local X.25 devices or X.25 network trunks at speeds up to 19.2K bit/sec.

ACP management

ACPs can be managed using Telematics' Programmable Communications Processor (PCP) X.25 switch running the company's Interactive Network Facilities (INF) network management software. Users can dedicate a PCP to support network management functions or both net management and X.25 switching functions.

A Digital Equipment Corp. VT-100-type terminal attached to an asynchronous port on a PCP can be used to perform INF functions. With INF, a network operator can configure, monitor and control a net of Telematics ACPS and PCPs.

Both the Net25 Series 30 and Series 20 ACPS are scheduled to ship in July.

The products are expected to cost from \$3,000 to \$9,000, depending on configuration.

Telematics can be reached by writing to 1201 Cypress Creek Road, Fort Lauderdale, Fla. 33309, or by calling (305) 772-3070. □

Racal-Milgo ups net mgmt. system reach

Communications Management Series can now support 512 remote dial-up modem chassis.

By Jim Brown
New Products Editor

SUNRISE, Fla. — Racal-Milgo recently expanded its Communications Management Series (CMS) network management system to support dial-up modem networks.

The IBM Personal Computer-based CMS 910 Dial Management System runs under The Santa Cruz Operation, Inc. Xenix operating system and supports up to 512 remote modem chassis, each of which can support 32 dial-up modems.

The CMS 910 is an enhanced version of and replacement for Racal-Vadic's VA9000 System Controller, an MS-DOS-based single-tasking personal computer modem management product. Racal-Vadic was recently folded into Racal-Milgo as the result of a corporate reorganization ("Racal melds its subsidiaries in corporate reorganization effort," *NW*, Feb. 20).

The major enhancement offered with the CMS 910 is the multitasking capability of Xenix, which lets the device receive network alarms and usage statistics in background mode while users process other tasks.

In addition, remote personal computer users can dial into the CMS 910 to access management data or perform CMS 910 console functions while the central-site operator performs other tasks.

Network operators can use the

system to configure, test and diagnose dial-up modems in a Racal-Milgo Dial Management System chassis or a Racal-Vadic MDS II chassis. The CMS 910 also enables central-site operators to detect and isolate modem operation and telephone line quality faults, manage modem inventories and statistically analyze modem activity.

The CMS 910 can be configured with as many as 16 ports to support up to 512 modem chassis. Controllers in the chassis monitor the status of and collect usage statistics for each modem.

The CMS 910 can be configured to dial into each chassis and collect statistics at user-defined intervals and to initiate diagnostic tests. The chassis controller also can be instructed to dial into the CMS 910 to report alarms.

Since data is exchanged in ASCII format, users can load usage statistics and diagnostic reports into existing data base management systems such as Ashton-Tate Corp.'s dBase III to generate custom reports.

The CMS 910 will be available in July. Pricing has not been determined, but a company spokesman said the product will likely be priced within the \$3,000 range, which is what an existing VA9000 System Controller costs.

Users can contact Racal-Milgo at 1601 N. Harrison Pkwy., Sunrise, Fla. 33323, or call (305) 475-1601. □

Gateway preps X.25 LAN bridge for Comdex debut

IRVINE, Calif. — Gateway Communications, Inc. last week said it will introduce at the Comdex Spring show in Chicago next month a high-speed X.25 bridge for Novell, Inc. local networks that supports speeds up to 64K bit/sec.

The G/Remote Bridge 64, a board-level product for IBM Personal Computers, will support Novell's Internetwork Packet Exchange protocol over dial-up or leased X.25 circuits between remote local networks supporting 2.0a or later versions of NetWare.

Designed for use with an RS-232 or V.35 interface, the G/Remote Bridge 64 will support up to 128 virtual circuits and be com-

patible with Gateway's existing G/Remote Bridge, which supports X.25 circuits at speeds up to 19.2K bit/sec.

Users will be able to house any combination of three G/Remote Bridge 64s and G/Remote Bridges in a single network-attached Personal Computer.

As with the G/Remote Bridge, it will be possible to configure and monitor the G/Remote Bridge 64 using any Personal Computer in the NetWare network. Pricing for the G/Remote Bridge 64 has not yet been set.

Gateway Communications can be contacted by writing to 2941 Alton Ave., Irvine, Calif. 92714, and by calling (800) 367-6555 or (714) 553-1555. □

OPINIONS

LANS

BY JOHN MCQUILLAN

Local nets may be returning us to the Dark Ages

Local networks offer companies many advantages: high performance, low cost, convenience and flexibility. Yet, ironically, there are signs that local nets are taking us back to the Dark Ages of networking.

Consider how local networks are planned, purchased and installed. In large organizations, local networks are a departmental responsibility, installed by people who are not information systems professionals (or at least were not five or 10 years ago). This means that, rather than learning from the mistakes that were made when wide-area nets were implemented in the 1970s, many of today's local network implementors are doomed to repeat those blunders.

Selection of the right local net technology requires good judgment: whether to go with the latest technology or select a more mature offering; whether to go with large and established vendors or more innovative small companies; and whether to select proprietary solutions or offerings that adhere to standards.

Overnight, the carefully developed and nurtured techniques for central planning and control of wide-area networks have been replaced with highly decentralized mechanisms and procedures for introducing local network technology. Organizations heavily committed to local nets find they must also be heavily committed to a widespread, long-term effort to provide users with a technical education in local networks.

For years, the planning of wide-area networks has involved detailed analytical modeling of traffic requirements. Queuing theory analysis and least-cost routing determine the optimal set of backbone circuits needed to support given amounts of traffic within acceptable response time and availability constraints.

Local networks are entirely different. Users don't know how much traffic their networks are carrying today, let alone how much they will carry next year. In many cases, users don't know where the traffic goes because of the broadcast nature of local networks. It is virtually impossible to model the behavior of individual users because they often do not perform the highly routine tasks that characterized early network users of transaction-processing systems in the '60s and '70s.

How do local network planners and administrators learn that their existing bandwidth is insufficient? They wait for users to call up and complain. Then what do they do? Turn to their analytical models to determine how much more bandwidth they need to install? No, they simply break the local net into two pieces, install a bridge and wait to see if the users' complaints go away. This is a return to the Dark Ages, before networks were modeled analytically.

The state of local network management also represents a giant step backward. Most of our wide-area networks, such as Systems Network Architecture, X.25 and T-1 backbones, are now equipped with intelligent tools to diagnose and report failures. Conversely, it's very difficult for companies with extended local net topologies that include many bridges and routers to discover which segment or bridge is failing and how.

Local net managers must establish better centralized control, more precise analysis and more effective network management. Otherwise, local networks will never become part of the enterprise network of the future. □

McQuillan is president of McQuillan Consulting in Cambridge, Mass. He assists users and vendors in planning future communications systems.

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EDITORIAL

Illinois Bell should pay users for losses from Hinsdale fire

Users searching for evidence that the regional Bell holding companies are still monopoly suppliers and not the free-market enterprises they claim to be need only look at what happens after a catastrophic service outage such as last year's Hinsdale, Ill., central office fire.

The Mother's Day blaze disrupted telephone service for more than 500,000 Illinois Bell Telephone Co. customers and caused service interruptions of up to a month. The outage cost Illinois Bell customers hundreds of millions of dollars, according to Illinois Attorney General Neil Hartigan. Yet tariffs limit the carrier's liability to refunding users only \$4 million for services never delivered.

This immense disparity between customer losses and the amount to be refunded points to a far more significant disparity — the one between the Bell operating companies and carriers in truly competitive markets.

Though its customers suffered severe losses, Illinois Bell escaped relatively unscathed from the Hinsdale fire. Had this been US Sprint Communications Co. or AT&T, users would be flocking to the carriers' competitors.

However, Illinois Bell has seen no such desertion because its customers have few, if any, economical alternatives. In fact, Illinois Bell revenue and earnings are near an all-time high. Revenue for the nine months ended Sept. 30, 1988, were

\$2.01 billion, up 3% from the comparable period in the previous year. The carrier's net income for the same nine months was \$248.7 million, a 16% increase from the previous year.

But there is a larger issue at stake. Shielding Illinois Bell from the negative consequences of a major network outage discourages BOCs throughout the country from investing in protecting the local loop.

Anecdotal evidence suggests that local carriers may be less conscientious about protecting

Had this been US Sprint or AT&T, users would be flocking to competitors. □

their networks than carriers in highly competitive markets. Consider US Sprint. Each of its switching centers is equipped with automatic halon fire suppression systems. They are built underground to limit exposure to lightning strikes and tornadoes, and are manned 24 hours a day, seven days a week, according to Chuck Slagle, director of safety for the carrier.

Hinsdale, one of five main hubs serving the Chicago area, was unmanned on weekends and

was not equipped with any kind of sprinkler or fire suppression system. The central office was typical of local carrier switching offices throughout the country, according to the Illinois Commerce Commission's final report on the fire ("Report lays blame for Hinsdale fire," *NW*, March 13).

To its credit, Illinois Bell has committed \$80 million over the next five years to improve network redundancy and enhance its fire detection capabilities. But given the current tariff restrictions, there is little encouragement for other local carriers to follow suit. They, too, can wait until a major service disruption before upgrading their disaster protection and prevention capabilities.

That's why it's important that Illinois Bell do more than reimburse customers for services not delivered. And this is where Hartigan comes in. He is petitioning the Illinois Commerce Commission to force Illinois Bell to compensate users for the hundreds of millions of dollars in business losses he says they experienced from the outage.

Forcing the carrier to compensate users for their business losses would send a strong signal to other local carriers to invest more in protecting the local loop. Also, it would be fair. As a regulated monopoly, Illinois Bell owes its customers not only a robust network but just compensation for losses when that network fails. □

OPINIONS

THE VIRTUAL TERMINAL PROTOCOL

BY BILL BUFFAM

A good idea whose time has passed

The International Standards Organization (ISO) is now in the process of publishing the Virtual Terminal Protocol (VTP). But with dumb terminals following vinyl LPs and card punches down the path to extinction, one wonders if this standard has emerged in time to be of any practical use.

What VTP provides is the ability for Vendor A's applications running on Vendor A's mainframe to be accessed by Vendor B's terminals connected to Vendor B's mainframe. The communications is transparent to the application, which is not aware of any difference between the "foreign" terminal and the "native" terminal. The VTP dialogue takes place between Vendor A's mainframe and Vendor B's terminal controller over Open Systems Interconnection communications protocols.

Thus, a vendor may make its applications run on any other vendor's VTP-compliant terminals by writing only one mapping routine on its application host. The VTP handler need only provide a mapping between the image expected by the application and the image as defined by VTP. The vendor does not need to change the application code itself.

Similarly, a vendor may give its terminals the ability to run any compliant applications by providing a routine that maps the VTP image, as defined in the standard, onto the vendor's terminal. Each distinct physical terminal type requires a different mapping routine.

VTP preempted

VTP would be a significant development if not for the facts that OSI is entering maturity and the dumb terminal is well into its geriatric years.

Intelligent workstations and personal computers are now the interface devices of choice for mainframe-based applications.

The terminal-emulation software so widely available for personal computers and other workstations has effectively pre-

Buffam is a networking consultant in the complex systems integration/engineering group at Unisys Corp. in Frazer, Pa. The views expressed in this column are his own and do not necessarily reflect the views of Unisys.

empted the need for VTP.

Increasingly, new applications will be designed around personal computers and workstations, not dumb terminals. The end-user workstation, not the mainframe, will become the apparent provider of the service.

In this scenario, the workstation communicates with the mainframe as a peer, beneath the operator's level of awareness. The application is essentially distributed between the mainframe and the workstation. The protocol between the two pieces is specific to the application. Although standards in this area will eventually emerge, they will be unrelated to VTP.

Not only have personal computers and workstations sup-

VTP, by addressing obsolescent technology, solves problems that have already been solved.



planted dumb terminals, but terminal emulation software has long been available for those application interfaces and terminals for which it has been cost-effective. Thus, many vendors have given terminals and controllers the ability to mimic such devices as IBM 3270s.

Mainframe vendors have also given their native applications the ability to communicate with these devices by using the terminal-emulation software in the application mainframe to hide the presence of the foreign terminal and its surrounding networking protocols.

Since cost-effective terminal emulations have been developed, implementation of the VTP service picks up only those terminal interfaces that were uneconomical when considered in isolation. Given that VTP must be implemented on the application host or the terminal host, and that a mapping must be made for each native application interface and terminal type, it seems doubtful whether any of this will make economic sense.

Today's terminal-emulation software ties together applications and terminals by bridging two proprietary networking architectures. In essence, the vendor providing the emulation makes its software conform to the network architecture of the other vendor.

On the face of it, migration to OSI-based networks means that OSI will replace the communications protocol support underpinning today's terminal-emulation software. However, things are not that simple.

Migration delayed

For various reasons, large networks will not migrate to an OSI backbone for some time. Information system-to-information system network layer protocols are not yet finalized, much less implemented. Also, a mixed-vendor backbone raises serious net management questions that OSI has yet to solve.

Furthermore, proprietary network architectures have had a long time in the field to gain the maturity users enjoy today. For the time being, networks will continue to be based on proprietary protocols such as Burroughs Corp.'s Burroughs Network Architecture and IBM's Systems Network Architecture, with OSI appearing only at the edges where the interface to other vendors occurs.

Although not explicitly endorsed by the ISO, it is possible to use a proprietary network architecture as a subnetwork to provide an end-to-end OSI path across the proprietary net, in the same way that OSI uses X.25 as a subnetwork. In such an arrangement, the underlying proprietary architecture remains available to support today's terminal-emulation software.

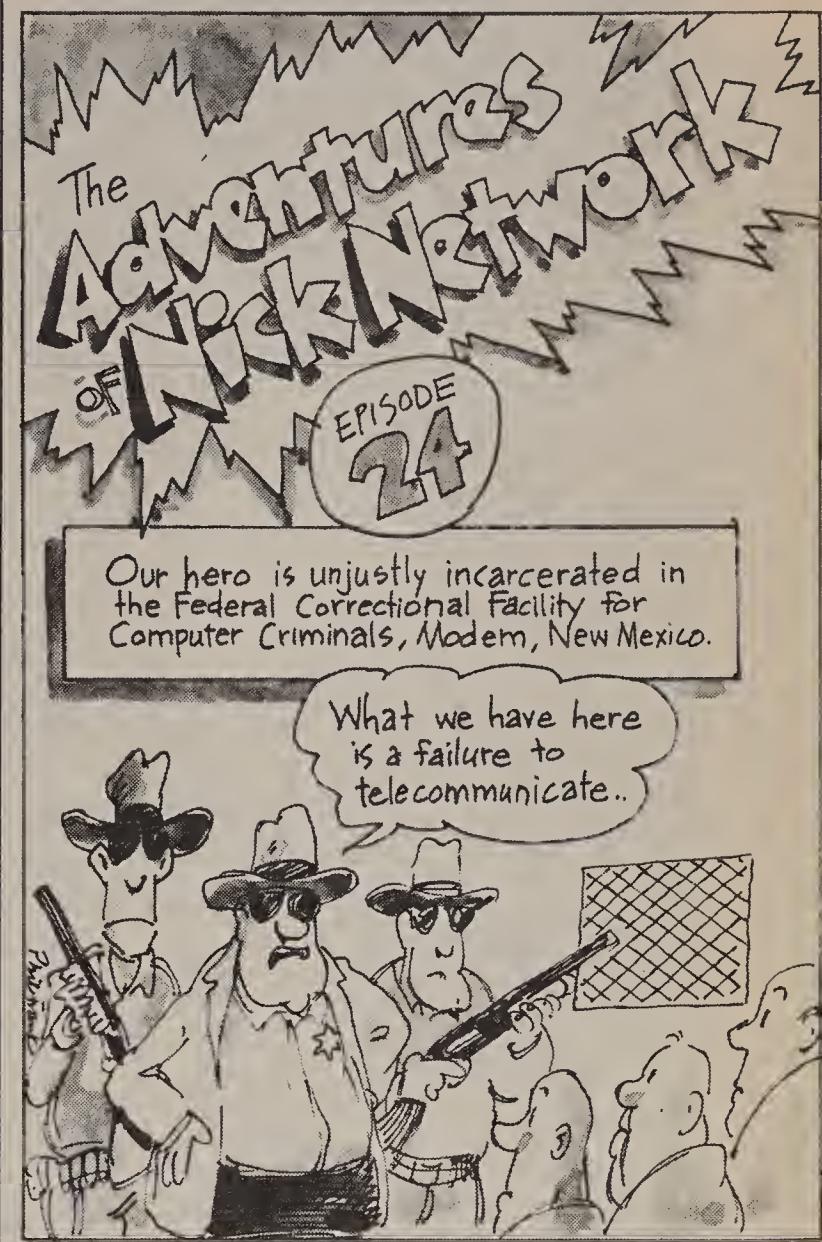
By the same token, an OSI-based backbone network could be used as a subnetwork underneath a proprietary network, again making available the proprietary protocols for terminal-emulation support.

In summary, VTP, by addressing obsolescent technology, solves problems that have already been solved. In addition, the infrastructure needed to support current solutions will be available well into the future.

The OSI VTP service has arrived too late. It was a good idea whose window of usefulness has passed. □

TELETOONS

BY FRANK AND TROISE



LETTERS

Catching the bus

Your editorial on telecommuting ("Management misses the bus on telecommuting's potential," NW, Jan. 23) was correct. Telecommuting is "a valuable management tool that can be used to make organizations more productive."

However, there is more to management's reluctance to embrace telecommuting than the mere force of habit. In many instances, the corporate executives involved are not prepared to deal with all of the effects of this sort of radical change.

For instance, they know that adopting telecommuting will reduce materially the size

of the corporate headquarters staff. And they know that such a reduction ultimately may force them to consider such tactics as:

- Reducing or eliminating the number of administrative support employees who provide such services as printing and catering for the staff.

- Eliminating some or all of

(continued on page 38)

Network World welcomes letters from its readers.

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Strike up the band

CONTINUED FROM PAGE 1
agement scheme. DEC's Enterprise Management Architecture (EMA), announced last September, is an ambitious plan to link multivendor, heterogeneous networking equipment, applications and other entities with a central management system.

In addition to EMA, DEC announced a range of network integration, design and management services. Such support is important as vendors look to consolidate and build market share in the 1990s, says Steven Wendl, program director for Gartner Group, Inc., a Stamford, Conn.-based consultancy.

"How are vendors going to hook customers?" Wendl asks. "It's going to be network management, network support, standards support — especially OSI — peer-to-peer network support, on-line transaction processing and backbone services." Backbone services include the ability to carry other types of networking protocols — such as X.25, Transmission Control Protocol/Internet Protocol, Open Systems Interconnection, IBM's Systems Network Architecture and DEC's DECnet — across a backbone net.

What is EMA?

EMA uses products developed by DEC and third-party vendors to allow users to

manage equipment and applications on a network. The initial development work centers on the DECnet Phase IV network.

There are six basic EMA building blocks: the Management Information Repository, the Executive, Functional Modules, Access Modules, Presentation Modules and the Interfaces between the modules and the Executive (see graphic, page 37).

The heart of EMA is the combination of the Interfaces, the Management Information Repository and the Executive. These provide the operating environment and interfaces required for multi-vendor network management as well as common central storage for management information. The Executive is currently being designed to run under a DEC VAX/VMS environment.

"We're not going to be licensing the Executive," says Bill Gassman, DEC marketing manager for network management. "It's open, but

it will run on a DEC platform. It's going to be a proprietary platform, but all the interfaces are open."

The "openness" comes from the Access Modules. DEC and seven third-party vendors are developing Access Modules that will allow network equipment such as private branch exchanges and modems to

(continued on page 36)

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A down-easter goes international



PHOTOGRAPHY ©1989 MARTHA EVERSON

Maine native Peter Brown calls the shots for DEC's international network.

Digital Equipment Corp.'s international communications network, one of the largest in the world, supports more than 97,000 users in 33 countries and connects 34,000 computer systems in 495 locations. The challenge of overseeing DEC's far-flung network is met by Peter Brown, manager of strategic technologies in DEC's Information Systems Division.

Brown, who grew up in Portland, Maine, first recognized the ongoing importance of communications systems when he entered into a work-study program as part of his cooperative education at Northeastern University in Boston. He worked at Gabriel Electronics, Inc. of Scarborough, Maine, a microwave antenna company, while earning his engineering degree at Northeastern. His next step was to earn a master of science degree in engineering and an MBA from Dartmouth College in Hanover, N.H.

Once out of school, Brown worked for four years at Gabriel Electronics before joining DEC in 1972 as a planning manager. Subsequent to that, he held a succession of management positions in different groups within DEC, gaining a strong background in designing and building digital products. He assumed his current position in 1987.

Brown describes himself as an engineer who worked in business and then found his way back to telecommunications with some business understanding. He's a polished and articulate manager whose belief in staying close to his customers is illustrated by his comment that "a customer visit is worth 10,000 words." When he's away from work, Brown enjoys spending time with his family, working on his summer home in Maine and coaching basketball at the YMCA.

Brown recently shared his thoughts on international networking issues with Network World Features Editor Steve Moore.

What specific effects will the European Economic Community's (EEC) market liberalization plans have on DEC's international network by the time 1992 rolls around?

I think we'll see changes in the European arena that will make life easier for that piece of our multinational (continued on page 35)

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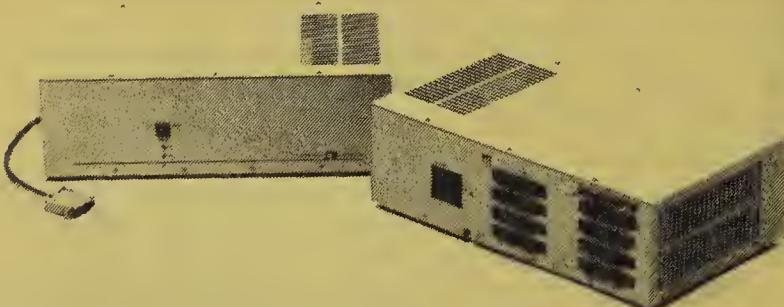
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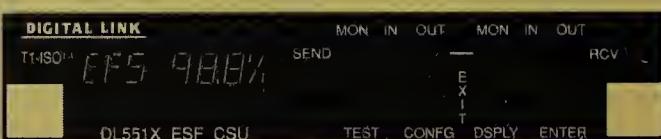
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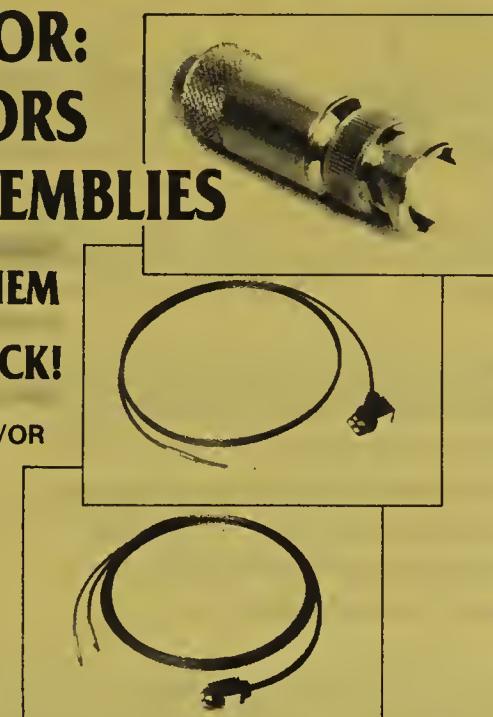
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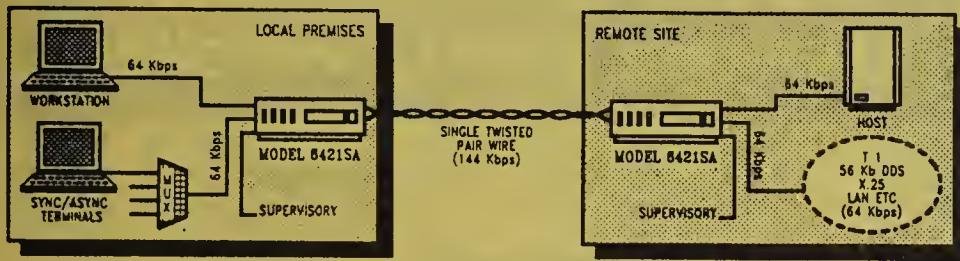
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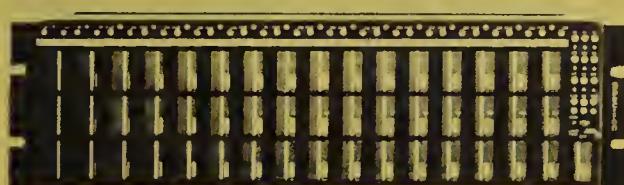


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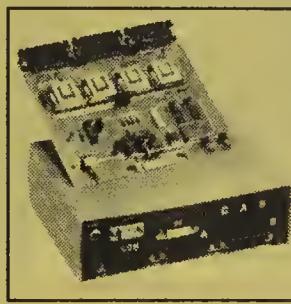
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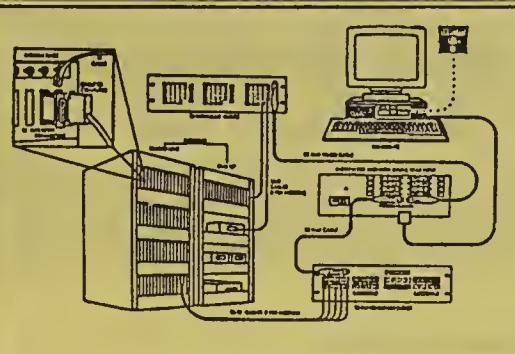
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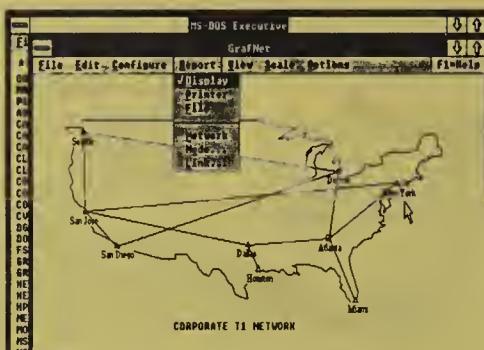
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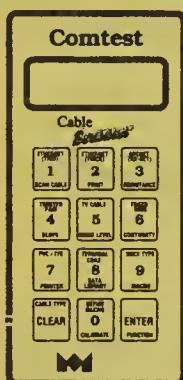
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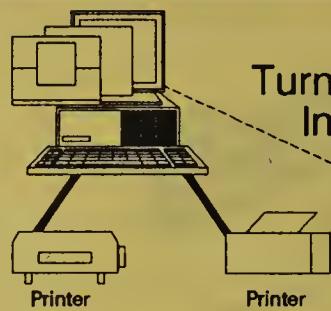
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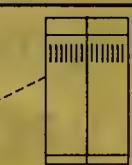
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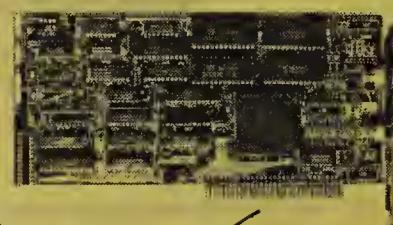
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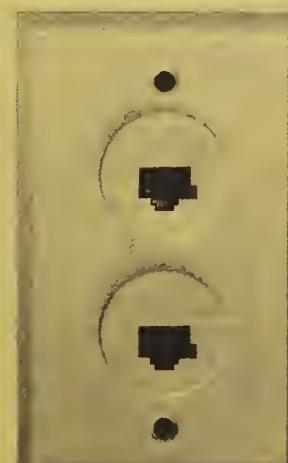
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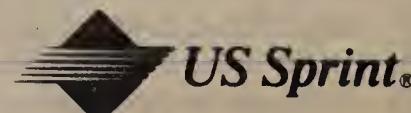
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A down-easter goes international

continued from page 29

network. I expect that the provisioning of communications services in Europe will be much easier than it is today. And the primary thing that will make that easier is shorter time frames — that's what I hope.

Another thing is that there are still interface problems in Europe today. That's the other thing that we'd like to see go away so that there is more commonality of interfaces for standard protocols as you go across national borders.

People trying to build private networks in Europe face a lot of issues in interfacing across all of the boundaries. So when we get to have Europe as a 'United States of Europe,' then I would expect that interfacing to PTTs should be easier because service should be uniform, as opposed to service being different in each country.

Will the 1992 changes make it any easier for you to handle billing and accounting for the European portion of your network?

The first question is: Will we have a common European currency? That hasn't been decided yet, but the answer to your question depends on it. Inside of the company, that's not a tremendous issue. I think it's a much bigger issue for people who have a network that they're doing rebilling on.

Everyone seems to be focusing exclusively on the EEC 1992 initiative. What other changes will take place by 1992 that will have important effects on your international network?

I think the biggest thing is the linking of countries with fiber across both the Atlantic and Pacific oceans.

That will give us the ability to have fiber around the world, which is very different from today, and it also happens to be where our major growth markets are going to be. It gives us the ability to have diversity of carriers, diversity of media and diversity of routing because you can have satellite or fiber and they can be with different carriers. From an international communications standpoint, I think that gives us a lot more at this point in time.

We're also very concerned with the Pacific Rim and developing countries, and of course, we have the undersea cables going that way. There's a lot of energy focused on what will happen in Europe in 1992, but I think a larger event will be when we have fiber around the world.

What effect will that event have on your international network operating costs?

We expect, because of the amount of fiber that's going in, to see reductions in costs. The question is: How much capacity are we

going to use? But if you look at it on a per-unit basis, I believe that connecting two points across oceans is going to cost less in the future, simply because there's going to be a lot of capacity there.

Are you already negotiating to reserve capacity on the new undersea fiber links?

We have that under heavy dis-

derstanding your computing requirements.

The Conference of European Postal and Telecommunications administrations recently moved away from the concept of volume-based pricing for private leased lines and instead proposed a 30% surcharge for users that want to access public networks and for users that are carrying third-party traffic

discussed at length over the coming months.

You've said that DEC's network is growing by about 50% per year but the data applications on the network are growing at a rate of 300% per year. Is that growth in data applications driven primarily by image traffic?

In our calculations for the future, imaging and compound documents are both included. I think if you were to look backward, you'd see a dramatic transition inside the company. Many things that we used to do with paper are now done electronically. Everything rides on the network from the time a customer orders something.

A salesperson talking to a scheduling center doesn't do it with letters or the telephone; it's usually done using the data network. The quote is prepared, the order is entered, and it's scheduled at various manufacturing sites around the world — all over the network. Then the actual confirmation of when the order ships, and the scheduling of field service and installation, also happens on the network. That's an evolution because three years ago, that wasn't done.

I think you can look at images as another form of data. The marriage of image to business is what's going to be critical; as far as transmitting it, data is data.

With the aggressive promotion of its Compound Document Architecture, DEC is trying to be a pioneer in the area of compound documents. When do you think you will see an increase in compound document traffic over your network?

We expect that to be emerging

over the next couple of years. We're working on some standards now to determine who needs that application and how to use it. And compound documents have large ramifications for storage of information, just as they do for network usage.

One of our concerns is that when you start having multiple-page documents that used to be [22- by 34-in.] drawings and you're putting them onto disks, you have to have a storage architecture and archival procedure that backs all that up.

We're trying to address that in a logical fashion, and we have an internal imaging team from telecommunications that's looking at that whole issue of how we do imaging, assessing the short-term and long-term demands for imaging and identifying the business applications that use it.

What bandwidth will be required to support networked image and compound document applications?

We're passing images today with our T-1 circuits. Also, our internal data network here in New England runs at 128K bit/sec, and we're passing images over that.

But the question is, how many and when? You may want to have heavy exchanges of image documents take place during off-peak hours so you can optimize the use of your bandwidth and not just add bandwidth for peak periods. When that approach gets in the way of doing regular business, then you have to look at expanding bandwidth.

What are the two most important pieces of advice you would offer to a network

(continued on page 36)

"I think the biggest thing is the linking of countries with fiber across both the Atlantic and Pacific oceans. That will give us the ability to have fiber around the world, which is very different from today, and it also happens to be where our major growth markets are going to be."

▲▲▲

cussion in our bandwidth group. We've started a demand forecasting process to figure out what our demand will be in future years. But we haven't yet actually reserved capacity on those links.

How do you handle demand management for your network?

I prefer to use the term demand forecasting rather than demand management. People determine how much they need, and we want to forecast that and manage our capacity to supply what people need.

We've made a careful separation between capacity planning and demand planning. You can manage capacity; you can't really manage demand. The reason is that if someone is unhappy with your level of service because you've tried to contain demand, they can go buy their own private line.

The telecommunications pace is driven by three specific things. One is the number of people, the number of buildings, the number of countries that you want to be connected to. The second thing is the level of service you want. And the third, which I believe is a dramatic change from the voice arena, is how fast applications are growing.

I think it's clear today that you could take any company and stop its growth as far as people go, and you would not stop its requirement for increased network capacity because of all the new applications that are coming up.

What that's doing is pushing the computer and communications industries closer and closer together.

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(continued from page 35)
manager who has been assigned to build an international network for an expanding multinational company?

First, you need to employ local nationals in the countries you're going into. You just can't expect anybody sitting in the U.S. to understand what's happening in Hamburg [West Germany] or Geneva, for example.

We have a slanted opinion because we have a huge nation with just one set of rules. When you go to some of the other continents that have smaller countries — all with varying rules — employing nationals is clearly the way to have a good interface with the PTTs and to have a good understanding of regulations in a given country so that you do things appropriately. And that need is not going to go away after 1992.

The second issue is that you really have to understand what kind of a network you want to put in place. What are your demand requirements, how big is it going to be, when is it going to be needed? And that ties right into the issue of understanding the vendor base you're going to be using.

If you have local nationals, they understand the local companies and the levels of service they can provide. The serviceability of the equipment that you use is a critical issue in an international network today. The service capability of a vendor is one of the principal factors in our vendor selection process.

What specific service capabilities do you look for?

We look for a response time to fix a problem. Our network spans the globe, and we really have reached the point where the network is the system.

If our network didn't work, something wouldn't happen — a manufacturing plant wouldn't get its orders, an order wouldn't get processed, or we would hold up the closing process. That's not acceptable. We need vendors that have the ability to service equipment in the areas where we choose to use a given vendor.

One of the most important things is product reliability; ide-

ally, you want to buy something that works forever. Unfortunately, not everything works forever, so the next thing you need for your field force is quick response time.

Are the vendors' technicians going to be resident? If they're not resident, how quickly can they respond and how quickly can we have spare parts? We prefer to have response within four hours, and two hours or one hour for backbone sites in particular.

Is there currently a shortage of skilled international networking staff people?

Yes, and it's not just an international problem, it's also a problem here in the U.S. In general, there are a lot of people who are extremely skilled in transmission theory and voice theory, but we don't have that many people who are skilled in data.

When you take the explosion of the data communications industry and you add in the restructuring of the way you deliver telecom services since divestiture, what you get is a severe shortage of skilled people.

I think the shortage runs the gamut from technicians to senior managers. Somebody who was a senior telecommunications manager in 1980 has a very different job today.

What specific skills are most valuable to people who want to build a communications-oriented career?

No matter what you're going to pursue in telecommunications, you have to understand voice, you have to understand data, and you have to understand T-1 — or E-1, as we refer to it in Europe.

A telecommunications manager also has to play a much larger business role today than ever before. You have to have a good grounding in business so you can demystify what telecommunications is and translate it into profit-and-loss terms, market share terms and quicker time-to-market terms for the business person.

What's the optimum balance between voice and data skills for communications professionals today?

Balance is the key concept. If you look at DEC, we are a high user of data, and I would say that we're approaching 50% voice and 50% data in our network traffic. What that says to me is that a person with balanced skills is valuable. The rounded telecommunications person with a good understanding of regulations is going to be in demand more and more, particularly as we deal more offshore.

Foreign languages will be very important; English is not the only language that a telecommunications manager should know. I've seen forecasts that say that by the

troubleshooting international circuits?

The first goal of our operations group is to get the people together, physically in the same room if that is possible, or via a conference call. Then we let our vendors understand that we have a problem that has to be solved collectively.

We do monthly reviews with all of our vendors, and those happen in multiple places around the U.S. and in Europe. The objectives are to talk about problems that occurred in the last month, talk about the escalation procedures and find out what worked

that'll be a way to solve problems.

Do you anticipate increasing the bandwidth available in your international network in the near future?

We can see the day coming when we will not have enough speed; and as a private network user, we're planning actively for T-3 and E-3 today. We have a couple of people who are looking at image transmission and [Fiber Distributed Data Interface] and so on. And we're trying to stay close to standards bodies to see what's beyond FDDI. Is it gigabit, or what is it? What will the standards be, and how will they interface with what we're doing?

What are your thoughts about the never-ending tension between standards and innovation?

That's the best way to say it: It's never-ending. You will see standards playing a larger role over time as computing and telecommunications come closer together, which says to me that it's more and more important to understand the role and the evolution of standards.

You're always going to have a group of people who say they have the next new mousetrap; and standards, like laws, are tempering things so that we don't go so far so fast that we have no room for recovery. The evolution to OSI clearly benefits the user.

What is the management structure behind DEC's international network?

We deliver our telecommunications services around the world using a country management concept. We have a manager for Europe; and inside each of the European countries, we have a telecommunications manager. We divide the U.S. geography into nine areas corresponding to our sales territories.

We use the same management structure for what we call the general international area. It includes everything in the Far East, plus South America, Mexico, Puerto Rico, Africa and Canada. It's the world minus the U.S. and Europe and a couple of other countries. □

“One of the most important things is product reliability; ideally, you want to buy something that works forever. Unfortunately, not everything works forever, so the next thing you need for your field force is quick response time.”



year 2000, there will be a significant part of the work force that will have a non-English language as their primary language.

How do you make sense of the patchwork of carrier services you have to deal with to operate an international network?

In most of our dealings, we will look at the field and select a subset of the field that we want to do business with, instead of some with everyone.

Manufacturing is a good analogy; you don't want to have 500 vendors for one part, but you want to have two or three vendors with whom you have built up a strong working relationship. Part of the reason for that is to maintain some competitive tension among the vendors.

How do you resolve finger-pointing problems when

well and what worked poorly.

There isn't a vendor in the world that wants to do a poor job, and if they're sitting in a room with their peers, they don't want to be the one that's not cooperating.

Aside from in-person conferences and voice teleconferences, have you tried other types of conferencing?

We have many of what we refer to as VAX conferences, which is essentially a method of electronic mail conferencing. Today, we apply that with our own internal people; we use it to solve many problems inside the company.

We also are looking at using full-motion video for communications to cut down travel and to give people visual contact. We haven't done that with vendor meetings yet. As the links across oceans become more critical,

Gassman says he doesn't see this as a problem for EMA's management system. It's more a matter of DEC and its vendor partners reworking the Access Modules to accept future OSI standards.

"We're not waiting for OSI details," Gassman says. "We're trying to come out with the functionality that we have today with DECnet. All the vendors will have the basic OSI subset, but it's the superset — the extensions that go beyond OSI — where the cooperation's going to have to happen. EMA Access Modules describe those extensions to the data base in the repository."

This isn't jumping the gun on OSI, Gassman asserts. "I'd call it

Strike up the band

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 connect with and be managed by the Executive.

The seven are: Codex Corp. of Canton, Mass.; Digital Communications Associates, Inc. (DCA) of Alpharetta, Ga.; Siemens AG of Munich, West Germany; Stratacom, Inc. of Campbell, Calif.; Timeplex, Inc. of Woodcliff Lake, N.J.; TSB International, Inc. of Ontario, Canada; and Vitalink Communications Corp. of Fremont, Calif.

The Function Modules will be plug-in applications from DEC and third parties. These modules

address the five areas of network management described in the OSI model: configuration, performance analysis, fault alarms, security and accounting.

The Presentation Modules, now being developed by DEC, are the user windows into EMA. Different modules will allow users to interact with the system through interfaces such as DECwindows, ASCII terminals and others.

Gassman says EMA won't be limited to DEC and DEC-sanctioned equipment. "Other vendors and customers that want to be in network management can get the specs and build software to tie into [EMA]," he says. No one can say for certain

when DEC will open development to outside parties. Both Gassman and David Korf, DEC's director of network management marketing, say that more than 100 third parties have expressed interest in working with DEC on EMA. Both also agree that the number of vendors should be limited to the current seven for the near term.

"We want to make sure the seven are ready before we open it up any further," Gassman says. "[When] we come up with a development kit, EMA will be open to anyone who wants it."

OSI

OSI is a major foundation block of EMA. DEC, like most ma-

jor vendors, has developed a plan to migrate its products to OSI conformance over the next several years. DECnet Phase IV, for example, will be changed to the more OSI-compliant Phase V while retaining its connectivity to past versions of DECnet. A similar strategy is being followed for EMA, which depends a great deal on the successful evolution of DECnet.

However, OSI network management specifications are far from complete. Therefore, EMA must necessarily be based on incomplete OSI standards and be able to migrate to the more complete standards as they become available.

making an investment," he says. "We will have an architecture that will do what the people need to do. If the specs change, we'll build a new Access Module, but we don't have to change what's inside [EMA]."

Well, where is it?

When EMA was announced in September, Anthony Viola, DEC product marketing manager for networks and communications, offered a tentative completion date of March 1989. However, delays have occurred, mostly caused by the great amount of input from the seven vendors to the System Reference Manual (SRM), which contains the specifications for interfaces and development of EMA products. These delays have invalidated Viola's predicted completion date.

"When you architect something in a vacuum, you bear the brunt of commentary when you expose it to others," says Frank Dzubeck, president of Washington, D.C.-based Communications Network Architects, Inc.

"I think DEC had some misconceptions as to how they were going to implement things, and I don't think they understood the magnitude of the problem," Dzubeck says. "June is a realistic date to expect the manual to be out. It's still too early [now]; no one has even seen any code."

"There's no indication that there's anything wrong," adds James Herman, a principal with Northeast Consulting Resources, Inc. in Boston. "It's just difficult, that's all."

"DEC is really trying to build a fully distributed approach to network and systems management," Herman says. "DEC is building for the future. They've made this kind of decision in the past — to take the time and build something that's really going to last over a wide range of situations and a long period of time."

"There's definitely a brief lull in the action here," says Steve Menk, director of network marketing at Codex. "That can't be denied. EMA product development is not moving all that quickly right now. A lot of us have been waiting for another draft or significant refinement of the SRM."

"We're basically in a position where DEC is dictating the schedule for us," says Marty Grubin, senior product manager for DCA's Open Network Management System. "I suspect things will start clearing up here around the second calendar quarter, when we actually can begin. It all depends on DEC supplying software, more information and the final documentation of specs — what we call the 'cookbook.'"

Consensus among the partners and observers is that we may see the first pieces of the puzzle at DECWorld '89 later this year. "I think you'll see something by the end of '89," Dzubeck predicts, "but it won't be as demonstrable as originally intended."

Dzubeck says he doesn't think

the initial delays will hurt DEC's development schedule. "In reality, this thing is embroiled in DECnet Phase V because of the OSI standards issues," he says. "So I don't think the slippage is that cataclysmic because Phase V isn't due to be available until 1990."

DEC will not officially predict EMA product availability, but Bill

users will access and manage them."

According to Menk and others, the differences lie in what the central management part of the system — in DEC's case, the Executive — does with the information it receives from the network. And there, according to Dzubeck, is one area where DEC and its

However, most of the seven third-party vendors planned to develop Access Modules to link the Executive with their own network management systems.

"That's the direction we're taking," states DCA's Grubin. "That makes the most sense; it's the easiest to implement. The way things are shaking out, there are a lot of pieces of equipment that will not directly interface with EMA in the near future."

According to Dzubeck, "EMA is going to connect management systems, not interface directly with end users' components. This was not DEC's intent; that was not the way EMA was constructed. It is constructed to control the actual network elements themselves. The vendors haven't seen it that way. That's the major disagreement."

Herman concurs. "What I've heard is that DEC really thought of their platform as talking directly to network devices, not to other management systems," he says. "It's a fundamental issue: Is the DEC system talking to other management systems, and if so, are things set up with their implementation of OSI to really make that easier?"

Gartner Group's Wendler sees the linking of management systems as a good thing. "There's nothing wrong with tying into other vendors' management systems," he says. "It's definitely more open than NetView. And the fact that you can direct, for example, Codex's network management system from EMA is a net positive."

But Dzubeck says he feels that the centralized/distributed dichotomy of EMA could create network traffic problems. "DECnet's architecture is really distributed," he explains. "When you start to impress a centralized function

on it, does it start to feed everything back and produce clogs? How much overhead does this introduce into the network? That's still a question."

According to Dzubeck, another unsolved question is what type of data base will comprise the Management Information Repository.

"[DEC would] like it to be a nonrelational, object-oriented data base," he says. Using such a data base could cause problems due to the relational data bases used by some of DEC's seven partners in their management systems; however, Dzubeck says, DEC may already be working on a solution.

DEC plans to use the Remote Procedure Call technology in Apollo Computer, Inc.'s Network Computing System to support wide-area networking applications. Dzubeck says this may be the foundation technology for linking the different data bases.

DEC's insistence on an object-oriented data base reflects some of its commitment to OSI; OSI management recommendations are based on object-oriented data bases. The difficulty, according to Herman, is that today's commercial data base technology is relational.

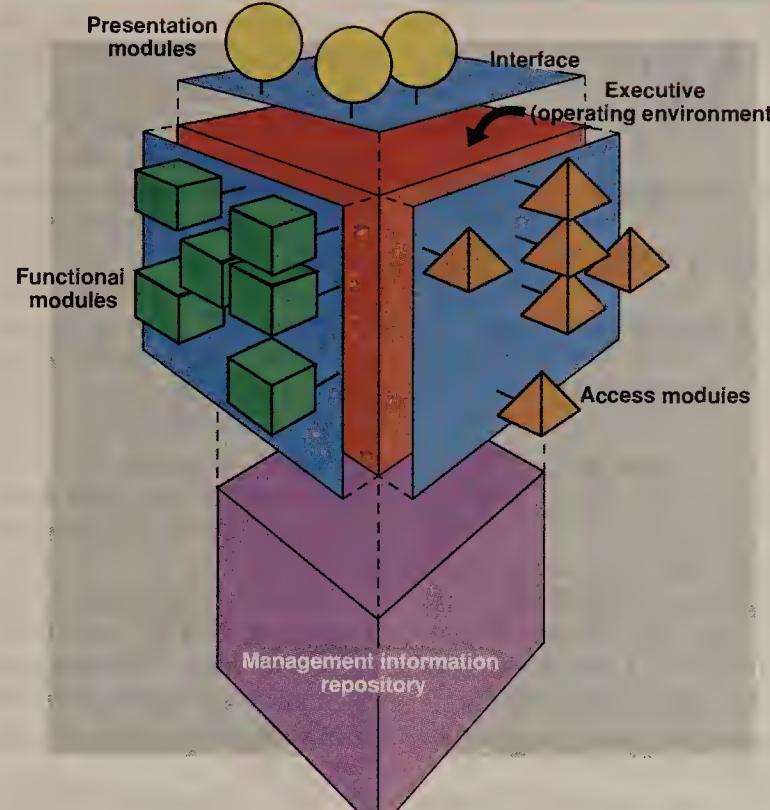
EMA as a market strategy

EMA's biggest competitors are IBM's NetView, AT&T's Accumaster Integrator and HP's OpenView. AT&T's minicomputer-based Accumaster Integrator is the core component of UNMA ("AT&T offers crown jewel in UNMA plan," *NW*, Feb. 6).

IBM's NetView, while not universally lauded, is a working, viable product. And HP recently announced alliances with 3Com Corp. and other vendors to boost

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DEC's Enterprise Management Architecture



GRAPHIC BY SUSAN SLATER

Johnson, DEC's vice-president of distributed systems, has reportedly said products will be available by April 1990. He has also predicted field testing of EMA products at some sites by the end of 1989.

According to Korf, DEC is coordinating product development through regular meetings with the seven vendor partners, which are expected to announce some level of product development simultaneously.

"DEC will try to make sure everybody has something ready at the same time," Codex's Menk predicts. "That's one of the reasons they were careful to choose only seven vendors."

EMA vs. the world

While DEC officials insist that the very structure of EMA gives it an advantage over offerings from IBM, AT&T, Hewlett-Packard Co. and other network management vendors, third parties don't agree.

"[Enterprisewide net management] is all the same business," Dzubeck says. "Basically, they're all OSI constructs. The issue is more semantic than anything else."

Menk agrees. "If you take a look at what AT&T has in [the Unified Network Management Architecture] or what HP has in their enterprise management package, it's absolutely not different from what DEC has in their EMA package," Menk asserts. "The advantage of each is in the application of the systems: how

"The demand for Codex's 19.2 kbps modem is growing fast. So you'll be glad to know you can order through us and get immediate delivery."

See us on page 43.

(continued from page 37) its enterprise connectivity strategy. Why is DEC bringing in EMA?

"There's a third of a million DECnet VAX licenses out there," DEC's Korf says. "We want to protect [user] investment."

"I think that any major vendor that doesn't have a strategy like this is missing the boat," says Nancy Kirk, director of research at The Sierra Group, an industry research firm in Tempe, Ariz. "It's a requirement to stay in the game."

"All big vendors have a network support program," Wendler says. "EMA is the key to DEC's. IBM is much better positioned in network support. They have about 18,000 employees in their systems integration division, as well as an established history of doing systems integration for the federal government. DEC has zero. DEC had to protect its flank on network management."

"EMA will absolutely not allow DEC to make a dent in IBM's position," Wendler says. "For existing SNA networks, EMA brings nothing to the table. If I'm on an SNA network and you're going to pitch EMA to me, forget it."

"It would probably be a good idea [for DEC] to include IBM connectivity/manageability to keep their installed base happy," says Kathryn Korostoff, a systems integration analyst with International Data Corp., a comput-

er and communications market research firm in Framingham, Mass. "It doesn't have to be fancy. Given the huge overlap in installed bases, somebody's going to do it, and it might as well be them."

"I can see an SNA Access Module being a very powerful tool," says Grubin. "If somebody wanted to market that, they would have a dynamite product."

DEC declined to comment on whether it will develop such a product. "Somebody could write an SNA Access Module if they so chose," Korf says. "If you look at interfacing into the SNA world, it doesn't say anywhere that DEC has to build them all. We may build some, but there is nothing restricting third parties from doing so. Obviously, it's a long-term goal to provide all that."

Korf agrees, however, that connecting EMA into SNA and NetView would be a good way to convince users that EMA is a viable product.

In Dzubeck's opinion, DEC may be waiting for IBM to make the first move. "When IBM releases their [Common Management Information Protocol/Common Management Information Service] products next year, it'll be more feasible for DEC to make a module," he says. "Right now, they'd have to do it the AT&T way, which is to have somebody else code the module.

You've got a marketing problem here; neither company is working in the best interest of the users."

One on one on one

Some analysts don't see any head-to-head competition for enterprisewide management among the big vendors.

"You'll have three or four [EMA-type systems] in major accounts," Dzubeck predicts. "They'll be integrable. You'll

account or a DEC account. In DEC's case, [EMA] is too intimate. The only vendor out there that's a true third party at the moment is AT&T."

The Sierra Group's Kirk doesn't see any of the four major vendors — AT&T, DEC, HP and IBM — as viable, objective integrators. "Everybody's saying 'We'll embrace the world,' but the reality is going to be a long time coming," she says.

All dressed up . . .

Despite Henry David Thoreau's proclamation, the world will not necessarily beat a path to your door if you build a better mousetrap. Users often find it difficult to be patient with vendors.

"Users aren't going to wait for the best top-of-the-line products," Kirk says. "They're not necessarily going to go out and buy into Digital's grand scheme unless they can do it today. And it has to be cost-effective."

Others, including DEC, feel that the most important users, those with DECnet installations, will wait.

"When they were just competing against IBM and NetView, it wasn't so bad," Herman says. "IBM just wasn't going to be able to make NetView that much better that quickly."

"The real problem for DEC today is AT&T," he says. "AT&T is doing a lot of what DEC is doing

— OSI, modular, tying together other vendors' systems. The difference is that you can walk up and touch AT&T's product. Market perception has shifted to AT&T as the leader in network management systems."

"The real issue is what can [users] do to survive today," Korf explains. "EMA isn't a pipe dream. We've proven the concept; it works. The issue is making it into a supportable product. The strategy is to inform users, to continue to enhance the products available today and migrate them to EMA, and to help users actually manage their networks."

The consensus is that DEC is making the right moves and is serious about building a solid, OSI-based enterprise networking architecture that will be able to grow and migrate as technology evolves.

"We think EMA is a very well-thought-out architecture," Wendler says. "It's going to be very similar to NetView, and it will integrate several products. Beyond that, they're going to improve the management of DECnet. And that's vital to them. DEC has to make EMA successful for DECnet networks; they really should be able to do so by 1990."

Otherwise, DEC may find itself all dressed up for the dance, only to discover that the users are already dancing with other vendors. □

“We've proven the concept . . . The issue is making it into a supportable product."



have one user presence with multiple network management systems." For now though, he sees AT&T having a better position than the others since AT&T's Accumaster Integrator is a more independent solution.

"The Integrator is a different story," Dzubeck states. "There's no reason it can't manage an IBM

Esrey on long haul

continued from page 12
were given to others.

Do you discount service prices for individual customers too? Is there a double standard here?

First of all, we are not the dominant vendor with that type of market share. Each customer we won from somebody else has justified our existence and has not been handed to us. I think AT&T has an obligation to treat all those customers the same. They do have monopoly power in the marketplace.

Sure, we compete for customers, and we try to satisfy and meet their unique requirements in a lot of different ways.

That may include price, but we will do for all customers the same type of thing on that type of service. We don't wait until somebody else comes in and tries to take the customer away and then decide to give that customer a break.

United Telecom said it acquired a controlling interest in US Sprint in part to improve management. Have you seen any benefits?

I have, and I think the management of Sprint has. They don't have people coming in from different directions asking a lot of questions from both parents. All the questions may have merit, but if you have to justify something to two organizations, it's obviously cumbersome.

Is there some concern from the local telephone side of United Telecom that the company is focusing too much on US Sprint?

For several years, our local exchange business has been the core of United [Telecom]. It has produced outstanding results. They've seen a lot of activity and interest toward Sprint as the new boy on the block. I think that's created some consternation and some 'Gee, do we have things out of perspective here?'

But I think our employees have seen what has happened at

Sprint, and a lot of them have moved over [to Sprint] and switched their career paths and have been able to contribute to the success of Sprint.

What are the benefits of having both a local and a long-distance business within United Telecom?

You're really dealing within the same industry. All of our employees and management people are dealing within the telecommunications industry.

[That involves] providing high-quality service to customers, [offering] new products and services, putting out bills, handling the customer service, and handling the regulatory and legislative issues. Obviously, there is a much higher emphasis on marketing and sales in the interexchange market. Otherwise, the functional requirements are very similar.

There is great opportunity to trade knowledge and expertise in that if you need an expert here or there or if you have a particular problem, you can transfer a man-

ager. Obviously, we're very careful because our businesses are regulated differently.

Why did US Sprint acquire Private TransAtlantic Telecommunications System, Inc. (PTAT)?

The real story is not so much the PTAT deal itself but the alliance we formed with Cable & Wireless PLC that will allow us to bring some new products to the marketplace in a very short time.

The type of things I'm talking about are services like international [Virtual Private Network], international private line and Global FON card ("US Sprint promises global VPN, T-1 upgrades, 800 service boost," NW, March 20).

The cable will be in service around Aug. 1. Right away, just in terms of plain old international service, customers will see quality that is wonderful 100% of the time. To be on the safe side, I'd say these other products will be available in the first quarter of 1990. Some of them we'd hope to have up [and running] sooner. □

Letters

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the many intermediate supervisors whose major task is to watch other members of the staff work.

■ Disposing of an elaborate headquarters structure that may be located on elaborately landscaped grounds.

The introduction of telecommuting into most organizations will initiate a process of radical change that can be expected to prove much more complex and far-reaching than is commonly suggested.

Most efforts to introduce what might be termed advanced technology have floundered because those involved in the introduction have failed to understand the nature and impact of altering the basic way in which an organization is structured and does business. There is much more involved here than simply improving throughput or expanding bandwidth.

Belden Menkus
Independent consultant
Hillsboro, Tenn.

Correction: The following product was inadvertently omitted from the Feb. 20 Buyer's Guide on token-ring local networks:

Vendor	Product	Compatibility	PCs supported	Backbone medium	Backbone speed (bit/sec)	Redundant link support	Maximum number of stations supported	Devices per multistation access unit	Packet data field (bytes)	Network operating system	Network protocols	Gateways	Price
Ungermann-Bass, Inc.	Net/One Token Ring	802.5, IBM Token-Ring	IBM PC, PC XT, PC AT, PS/2 family	Twisted pair	4M	Yes	260 shielded, 72 unshielded	20	4,096	Net/One MS, OS/2 LAN Manager, Net/One PC, NetWare, IBM PC LAN	XNS, TCP/IP, NETBIOS Extended User Interface, NETBIOS	Net/One Token Ring — Ethernet Data Link Bridge, asynchronous terminal server, 3270	Varies depending on size and configuration

AT&T reveals rates for FTS 2000

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vices, complete with pricing information. "AT&T plans to file the [tariff] again . . . and include the FTS 2000 rates on the public record," the letter said.

Volume equals savings

At the users group meeting, Gary Forsee, AT&T's vice-president of sales for General Services Administration programs, said, "There is a clear requirement that [FTS 2000] costs be lower than commercially available rates." There is little chance that corporate users would be able to generate the traffic volume needed to justify the deep discounts AT&T offered the government.

Forsee said there will be minimal difference between the prices billed to agencies on AT&T's portion of the FTS 2000 network and on US Sprint Communications Co.'s portion due to the use of "equalized rates."

The GSA, which oversees the network, has decided to bill agencies at a rate that is an average of the prices to be charged by both carriers.

Under such an equalized rate structure, Forsee said the cost of

a five-minute switched voice call on a high-density route — such as from Washington, D.C. to San Francisco — would drop by about half, to approximately 13.5 cents per minute below FTS 2000 rates.

Since this is an averaged price, and analysts have speculated that AT&T underbid US Sprint's FTS 2000 prices, AT&T's rates for switched voice service to the government would fall below 13.5 cents.

AT&T's prices for corporate users are higher, even under special tariff arrangements. For example, AT&T is offering 1+ switched voice service to Marriott Corp. at 16.5 cents per minute under a special arrangement dubbed Hospitality Network Service. AT&T is charging Holiday Corp. 15.8 cents per minute under its Tariff 15 discount offer, according to information provided by MCI Telecommunications Corp., which competed for the hotel chain's business.

Kenneth Phillips, chairman of the Committee of Corporate Telecommunications Users, a group of the largest corporate telecommunications users in the

country, said he does not think it is unfair that the government will be receiving lower rates.

But he said corporate users should be able to get the same prices if they can commit to the same traffic volumes. Provisions in the Communications Act of 1934 prevent AT&T from discriminating between similar customers taking the same service.

Jim Blaszak, counsel for the Ad Hoc Telecommunications Users Committee, said he does not expect users to protest if AT&T's rates for FTS 2000 are lower than generally available prices. He said users realize that the economics of the FTS 2000 network yield particularly attractive rates for the government.

But Blaszak said customers may use the FTS 2000 rates as a benchmark for future network deals. "I would expect large users to be cognizant of the rates in whatever negotiations there might be with AT&T or the other carriers," he said.

Susan Gately, senior consultant with Economics and Technology, Inc., a Boston-based research firm, agreed. "Once the lower [FTS 2000] rates are out, large customers will start crying for lower rates." □

X.500 eases integration

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for computer communications.

Development of the messaging directory is part of the utility's effort to link the diverse E-mail systems and networks used by its 32,000 employees. The directory provides a consistent, simple way for employees to access the addresses needed to send messages to users of other systems.

In a standard format, the directory lists E-mail addresses, telephone numbers and other information about each employee and contractor with which the utility does business. Without such a directory, users would have to maintain their own address files or be limited to the directory provided by their E-mail system.

To make its directory accessible to anyone on the network, Ontario Hydro opted for what it calls a quasi-distributed directory concept.

The company extracted information from personnel records and created a data base using data fields defined in the X.500 standard. The directory is stored on an IBM VM-based mainframe here and downloaded to local net file servers in the utility's 100 offices. Employees at each site extract information from that copy.

That approach differs from the truly distributed approach called for in X.500. In an X.500 directory environment, each site would maintain a portion of the data base, not a full copy, and users would be able to transparently query any portion.

The utility is implementing the directory on its host and a mix of local nets. Those nets include Sytek, Inc.'s LocalNet 2000 and LocalNet 6000, Ungermann-Bass, Inc.'s Net/One and IBM Token-Ring Networks running Novell, Inc.'s NetWare and IBM's PC LAN network operating systems.

Local net administrators and a mainframe operator update the directory by creating an update file, which is then transmitted overnight via SNA to the mainframe. The host updates the central data base and downloads new copies to the servers the next day.

"What we have is a complete data base on each net at each

site," Carayannakis said. "You may say it's redundant. However, response time is quick, and the data is accurate within 24 hours."

Users extract data from the directory using workstation and server software supporting various protocols. Workstations and the mainframe run an application similar to X.500's Directory User Agent. That application transparently transmits data requests via the local net or SNA net to file server- or host-based Directory Service Agent software. □

User sidesteps NetView/PC

continued from page 1

here. He said the company is confident it can enhance the various intelligent devices in its network to enable the monitoring and control of all components from its mainframe-based NetView network management system.

"You would believe from [IBM's and other vendors'] literature that some of what we've done is not doable," Brener said. "We'd like to dispel that."

As a first step to bringing third-party equipment directly under NetView, the company focused its efforts on the cluster controllers it has installed around the country to support dial-up point-of-sale transaction authorization terminals.

The controllers convert the POS terminals' native Visa protocol, a 300 bit/sec ASCII protocol, to an IBM Systems Network Architecture LU 0 session for communications with a mainframe that authorizes or rejects the transaction, Brener said.

Although these specialized controllers can generate alarms for NetView, the company could not control the devices from a NetView console without installing NetView/PC, Brener said.

Working in conjunction with the vendor of the controller, which Brener declined to name, American Express developed network management software that lets the devices generate NetView-compatible generic alerts and respond to commands issued by a second software component running on the host with NetView.

The ability to respond to commands is an important feature, Brener said, because it gives the network operator the ability to request information, such as av-

erage response times, from the controller device. Network operators can use that information to set or change thresholds.

Alarms are routed from controllers to an American Express IBM 3745 front-end processor using a System Services Control Point-to-physical unit session carried over the same physical link as the authorization data. The network control program forwards the alarms through VTAM to NetView.

To upgrade the controllers, American Express had to define the generic alerts the devices would generate as well as the commands they have to accept. That job fell to John Shelby, manager of network software support at the company, who completed it in about four months.

Working from IBM technical manuals, Shelby provided the controller vendor with a bit-for-bit description of each generic alert and command American Express required. Also included was a set of recommended operator responses to each alert, Brener said. The vendor developed the code to implement the alerts and commands on its device.

Shelby stressed that the same type of code would have been required if the company had opted to use NetView/PC.

To meet the ultimate goal of managing its entire multivendor voice and data network from NetView, American Express is pushing vendors to supply the functional equivalent of NetView/PC in their devices, Brener said.

"Most of [the devices] are intelligent boxes and have the capability of providing the NetView function," said Larry Marcus, manager of network systems for American Express Worldwide Telecommunications. "Why have NetView/PC sitting in there?" □

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Codex's 19.2 kbps modem
because they offer prompt
on-site service: the best
network insurance
of all."**

See us on page 43.

“You’ve got the best computers and the most reliable network in the world, but your data transmission still gets garbled.

Maybe you’re buying the wrong modems.”

—Ed Hines, Engineering and Quality Director of AT&T manufacturing plant, Montgomery, Illinois

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AT&T

The right choice.

AT&T to benefit from regulation

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er obvious targets for cuts.

But improvements in profitability will not come overnight, Boczar predicted. "When you have a large ship that's turning around, it takes a long time to turn," he said.

Profits will begin to grow significantly in 1990, according to Frank Dzubeck, president of Communications Network Architects, Inc., a communications consulting firm in Washington, D.C. "I think AT&T will make more than people ever anticipated," Dzubeck said. "If AT&T can make 30%, let them make 30%."

Under current regulation, Dzubeck said, AT&T has been under "artificial requirements" to spend money. Cutting costs should not be difficult, he added.

If AT&T's profits increase significantly, the price cap plan will be good for business users, analysts said. It is likely that AT&T will invest increased profits to further upgrade its network and to support R&D on advanced telecommunications services, Dzubeck said.

The introduction of these new services will set the stage for "an even more vibrant market," as AT&T's rivals battle to keep pace or gain an edge, Boczar said.

AT&T is likely to invest some of its new profits in acquisitions, Dzubeck said. It has shown an increased willingness to acquire

new technology, as illustrated by its recent purchase of Paradyne Corp.

Split decision

Industry watchers were split on how AT&T will use its new pricing flexibility. If AT&T chooses to slash prices to floors set by the FCC, a price war is possible, said Robert Self, the New York-based author of *Long Distance For Less*, a guide to long-distance services in the U.S.

AT&T has been preparing for price cap regulation for months by repositioning or repricing just about every offering in its long-distance arsenal, Self said. Now, within the price cap limits, AT&T can increase or decrease prices to an optimum level, he added.

"I think there is going to be a price war," Self said. "AT&T has said in several places that it has yet to be aggressive on price."

Other analysts disagreed.

"I don't see any major price war," Boczar said. "I think this would be an invitation for deregulation and it would counteract some of the progress that AT&T has made in the regulatory arena in the last few years."

Any precipitous moves on AT&T's part would be surprising, agreed Bob Wilkes, a telecommunications analyst at Brown Brothers Harriman & Co., a New York-based brokerage firm. "AT&T is still somewhat in a political arena, and what's been done can be undone if it has to be," he said. □

Card suppliers wage price war

continued from page 2

4M bit/sec IBM Token-Ring Network Adapter II card twice in the past four months. The cost of the IBM adapter was cut 27%, from \$895 to \$650, the spokeswoman said. IBM's Token-Ring adapter prices were not affected by the company's recent across-the-board 5% price hike (see "IBM implements 5% price hike on products, services," page 11).

IBM currently sells 80% of all token-ring adapter cards, according to statistics supplied by Rick Villars, senior analyst for local networks at International Data Corp. (IDC) in Framingham, Mass. But increased competition from third-party vendors will cause IBM's adapter sales to erode to about 60% by the end of 1990, Villars predicted.

Token-ring board vendors are resorting to price cuts to gain market share from IBM and other rivals. IDC estimates that 1.1 million token-ring cards will ship this year, an increase of 90% over the 576,000 shipped in 1988.

Confidence abounds

Users said they are more confident these days about interoperability between third-party token-ring adapters and IBM products because IBM, the de facto industry standard maker, has worked closely with Texas Instruments, Inc. to develop a standard chipset that provides both IEEE

802.2 logical link control and IEEE 802.5 token-ring compatibility.

The IEEE 802.2 functionality will enable third-party adapter suppliers to offer an option on their cut-rate boards that would make them interoperable with IBM counterparts. That way, third-party vendors could offer a low-cost board to small companies for whom IBM interoperability is not a factor, and they could offer the 802.2 option to companies that need interoperability with IBM nets.

Racore's \$399 board, for example, provides only 802.5 compatibility. In order to interoperate with IBM Token-Ring products, it requires a daughterboard that supports the 802.2 standard. The daughterboard option costs \$70.

True Blue at heart

Despite the lure of lower prices and interoperability with IBM Token-Ring offerings, some stalwart IBM users said they will not switch to third-party 4M bit/sec token-ring adapter offerings.

"We'll stick with IBM Token-Ring adapters because we're ensured of compatibility and service," said Glen Holcomb, personal computer specialist at Mutual of America, an insurance company in New York. "We just don't want to take the risk that a board will fail and we'll be without a replacement part or that we can't get service within 24 hours." □

Calendar

April 10-11, San Francisco — Service Trends '89. Contact: The Ledgerway Group, Inc., 430 Bedford St., Lexington, Mass. 02173; (617) 862-8500.

April 10-13, Pasadena, Calif. — Electronic Imaging '89 West. Contact: CAP International, Inc., 1 Longwater Circle, Norwell, Mass. 02061; (617) 982-9500.

April 10-13, Chicago — MACdex. The Center of the MAC Reseller Universe. Contact: Interface Group, Inc., 300 First Ave., Needham, Mass. 02194; (617) 449-6600.

April 11-12, Chicago — Critical Mission: Strategic Manufacturing Information Systems. Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114; (617) 367-1000.

April 11-12, Memphis, Tenn. — North American MAP/TOP Users Group Meeting. Contact: North American MAP/TOP Users Group, P.O. Box 1157, Ann Arbor, Mich. 48106; (313) 769-4456.

April 11-13, New Orleans — EDI '89. Contact: Data Interchange Standards Association, Suite 355, 1800 Diagonal Road, Alexandria, Va. 22314; (703) 548-7005.

April 11-14, Tysons Corner, Va. — 19th Annual Infodata International Conference. Contact: Infodata Systems, Inc., 5 Tobey Village Office Park, Pittsford, N.Y. 14534; (716) 381-7430.

April 12, New York — Communications Managers Association (CMA) Membership Meeting & Professional Education Program. Contact: CMA, 40 Morristown Road, Bernardsville, N.J. 07924; (201) 766-3824.

April 12-13, Hartford, Conn. — Telecommunications Technologies for the Non-Engineering Professional. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015; (201) 478-5400.

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Novell buys Excelan to extend reach

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to-Ethernet market with its FastPath 4 gateway.

For Novell NetWare users, the wedding of the two companies is likely to offer tighter integration between NetWare nets and networks based on TCP/IP and OSI. The merger may even give Novell an entry into nets that support OS/2 LAN Manager.

"With the importance of TCP/IP, OSI, [Sun Microsystems, Inc.'s] Network Filing System and AppleTalk to our Open Protocol Technology, the merger makes a perfect fit," said Craig Burton, Novell senior vice-president. Novell uses Open Protocol Technology to support a variety of protocols.

The acquisition culminates a relationship begun in 1987, when Novell helped Excelan develop a TCP/IP link for NetWare that the two companies now comarket. More recently, Novell contracted to resell Kinetics products with its new NetWare Version 2.15 for Macintosh.

Steve Spanier, a vice-president at Infonetics, Inc., a market research firm in Santa Clara, Calif., called the merger complementary and said Excelan brings a lot more than TCP/IP to the table. "Exelan has had OSI work going from the beginning," he said.

Besides the commercial importance of the protocols, the TCP/IP expertise will help Novell sell into the government marketplace, according to Harold Lockhart, a senior consultant at Technology Concepts, Inc., a Sudbury, Mass.-based communications consulting firm. He said it also gives the company an OSI foundation for products that comply with the Government OSI Profile (GOSIP).

"With GOSIP coming on, it makes it harder for Novell to sell into government accounts because they support nonstandard products," he said.

Eric Arnum, data communications analyst at International Resource Development, Inc., a New Canaan, Conn.-based market research firm, concurred with Lockhart. "Novell has bought an entrance into the government marketplace," he said.

Microsoft twist

Spanier said an interesting twist to the acquisition was Excelan's role in Microsoft Corp.'s efforts to launch its LAN Manager network operating system as a challenger to Novell's NetWare.

A year ago, Microsoft selected Excelan, a LAN Manager licensee, to provide the TCP/IP transport software for the OS/2 LAN Manager. Just last month, Excelan announced TCP/IP software for Microsoft's Unix-based LAN Manager/X.

"We would like to maintain that relationship," said Kanwal Rekhi, president and chief executive officer of Excelan. "Someone should build LAN Manager-to-NetWare bridges, and we are in an excellent position to do that."

Spanier said it appears that Excelan's LAN Manager license is transferable to Novell, but he added that "some legal ramifications are still outstanding." He said Novell and Excelan would attempt to meet with Microsoft this week to discuss the issue.

Microsoft officials, who were informed by Excelan of the intended merger last Thursday, could not be reached for comment by press time.

The boards of directors of Novell and Excelan met last Thursday and voted to ac-

cept the agreement based on a stock swap. The deal now awaits approval by Excelan's shareholders, who are expected to vote in favor of it at Excelan's annual meeting June 7.

Exelan posted sales of \$66 million in 1988, up from \$39 million the previous year.

Exelan cofounder Rekhi is to become a Novell executive vice-president, and he will be nominated to Novell's board of directors. Excelan will operate under Rekhi as a wholly owned subsidiary of Novell.

Novell Chairman and Chief Executive Officer Ray Noorda said the new subsidiary's products would continue to be sold under the Excelan and Kinetics brand names "for the foreseeable future." □

Bob Brown contributed to this story.

Show-goers plot SCADA strategies

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WPL's first SCADA network consisted of six multidrop leased lines, each of which supported about 20 drops, according to Donald Tillery, senior communications engineer for the firm. "Although the amount of data generated at an individual site is small, each site had to transmit its data at five-second intervals to the SCADA host computer in Tulsa," Tillery said.

The WPL leased-line net ran at 1,200 bit/sec. However, the firm's pipeline modernization program, which called for increased automation at field sites, would require higher data throughput, Tillery said. This would have meant a sizable expense for line conditioning and faster modems.

Reliability was a key factor in the decision to go with a VSAT network.

"The average availability of a location on leased lines was about 99.28%. This equaled an average yearly outage of 63 hours per year per location," Tillery said. "To compound problems, we had to deal with over 30 independent telephone companies" for service.

The reliability of a site served by VSAT, microwave or fiber was equal, according to Tillery. "Availability figures of 99.86% or better were considered attainable. This equates to an average outage of about 12 hours per year per location," he said.

The VSAT network cost considerably less to implement than a private microwave or fiber network. "VSATs were the only cost-effective alternative to leased lines," Tillery said. □

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